

Appendix C
Summary of Automated Emissions Sampler Data by Test

AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Klamath Falls, Oregon USA
Test Run Number: Week B
 Test Period Start Date/Time: 12/04/98 05:47:00 PM
 Test Period End Date/Time: 12/10/98 02:32:00 PM
 Stove Model Tested: **KF01: Quadrafire 2100 Non-Catalytic**
 Stove Type: New Tech/Non-Catalytic

Time

Total Test Period **141.00** Hours
 Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F) **93.5** Hours
 Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F) **66.3%**

ESS Settings

ESS Sampling Rate **0.985** L/Minute
 Sample Cycle Duration **15.00** Minutes
 Sample Time Per Sample Cycle **120** Seconds

Fuel

Total Fuel Used **145.0** KG With Moisture
 Average Fuel Moisture **24.5%** Percent Dry Basis
 Total Fuel Burned **116.5** KG Dry
 Average Burn Rate During Stove Operation **1.2** KG/Hour (dry)

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar) **493** Degrees F **256** Degrees C
 Test Facility Ambient Temperature **62** Degrees F **17** Degrees C

Particulate Emissions

Emission Factor **8.7** G/Kg
 Emission Rate **10.8** G/Hour
 Concentration **466** Mg/M3

Breakdown of Particulate Sample

Rinse	47.5%
XAD-2	12.1%
Filter	40.5%
Total	100%

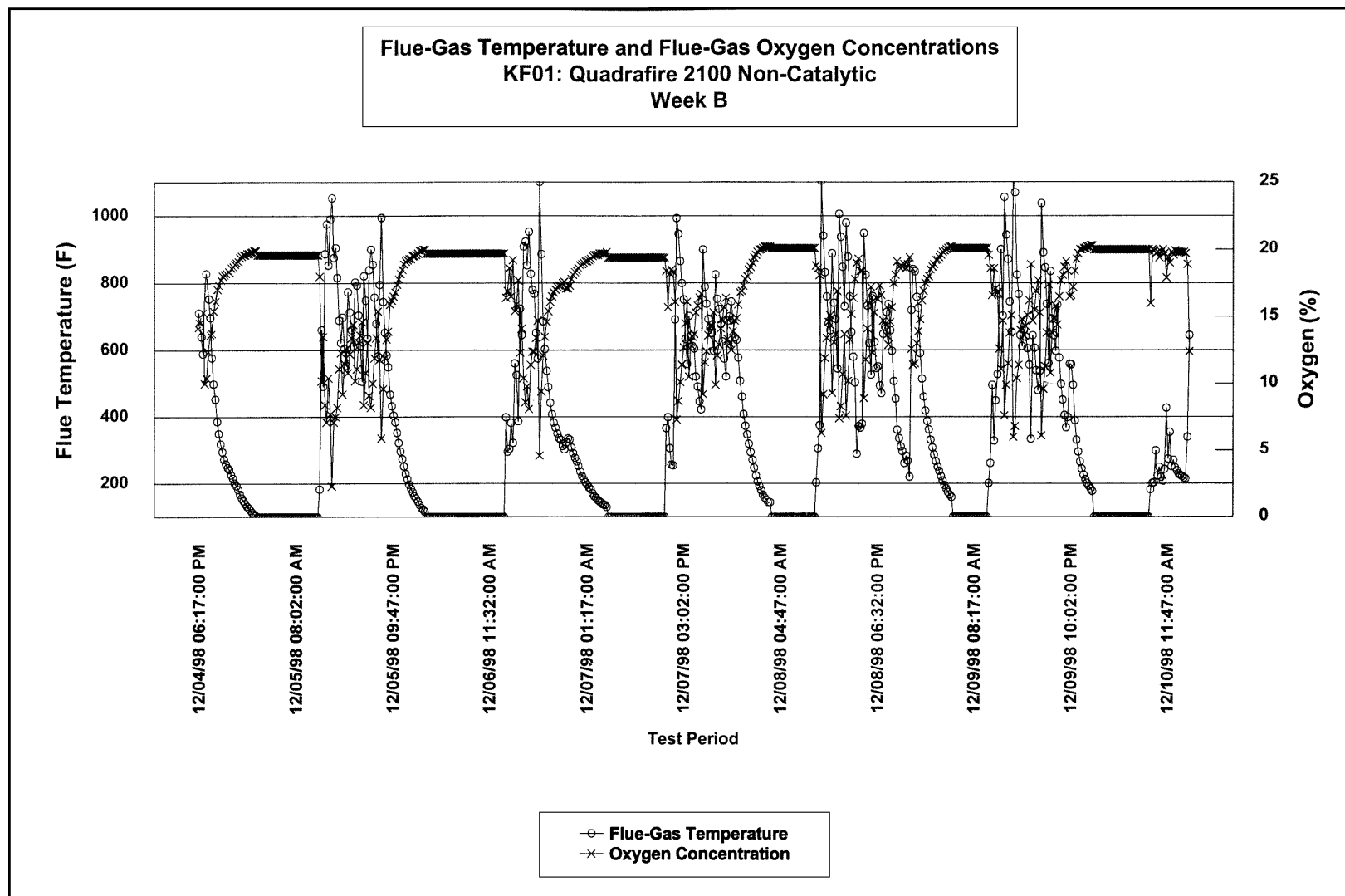
Average Flue-Gas Concentrations

Oxygen (AWES) **15.54** Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume Is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Klamath Falls, Oregon USA
Test Run Number: **Week B**
Test Period Start Date/Time: 12/04/98 05:47:00 PM
Test Period End Date/Time: 12/10/98 02:32:00 PM
Stove Model Tested: **KF01: Quadrafire 2100 Non-Catalytic**
Stove Type: New Tech/Non-Catalytic

Time

Total Test Period **141.00** Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F) **93.5** Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F) **66.3%**

ESS Settings

ESS Sampling Rate **0.985** L/Minute
Sample Cycle Duration **15.00** Minutes
Sample Time Per Sample Cycle **120** Seconds

Fuel

Total Fuel Used **145.0** KG With Moisture
Average Fuel Moisture **24.5%** Percent Dry Basis
Total Fuel Burned **116.5** KG Dry
Average Burn Rate During Stove Operation **1.2** KG/Hour (dry)

Average Flue-Gas Concentrations

Oxygen (AWES) **15.54** Percent

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar) **493** Degrees F **256** Degrees C
Test Facility Ambient Temperature **62** Degrees F **17** Degrees C

Particulate Emissions

Emission Factor **8.7** G/Kg
Emission Rate **10.8** G/Hour
Concentration **466** Mg/M3

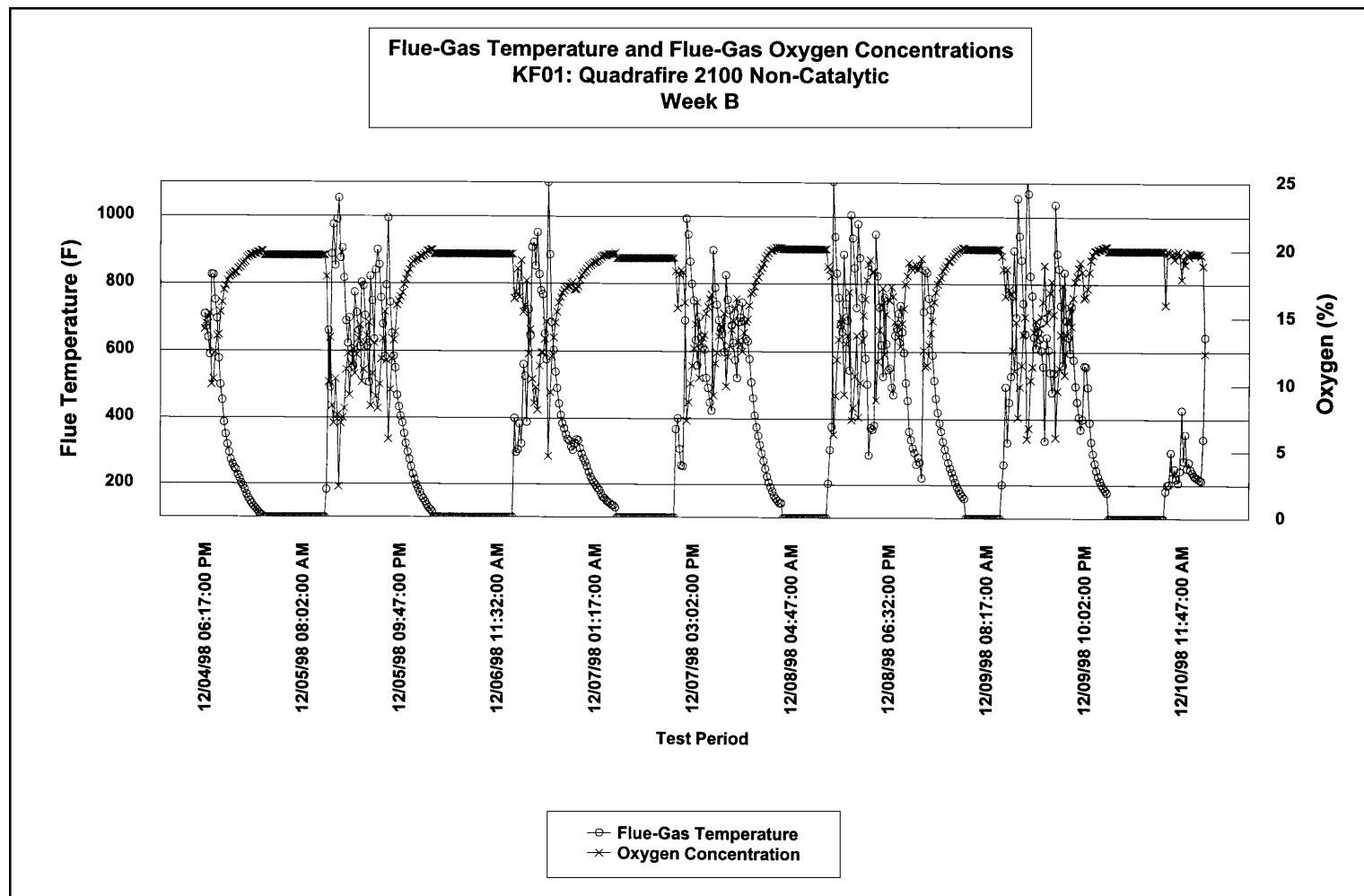
Breakdown of Particulate Sample

Rinse	47.5%
XAD-2	12.1%
Filter	40.5%
Total	100%

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Klamath Falls, Oregon USA

Test Run Number: **Week C**

Test Period Start Date/Time: 12/10/98 04:02:00 PM

Test Period End Date/Time: 12/16/98 02:32:00 PM

Stove Model Tested: **KF01: Quadrafire 2100 Non-Catalytic**

Stove Type: New Tech/Non-Catalytic

Time

Total Test Period **142.75** Hours

Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F) **43.25** Hours

Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F) **30.3%**

ESS Settings

ESS Sampling Rate **0.985** L/Minute

Sample Cycle Duration **15.00** Minutes

Sample Time Per Sample Cycle **120** Seconds

Fuel

Total Fuel Used **77.3** KG With Moisture

Average Fuel Moisture **31.4%** Percent Dry Basis

Total Fuel Burned **58.8** KG Dry

Average Burn Rate During Stove Operation **1.4** KG/Hour (dry)

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar) **482** Degrees F **250** Degrees C

Test Facility Ambient Temperature **72** Degrees F **22** Degrees C

Particulate Emissions

Emission Factor **4.8** G/Kg

Emission Rate **6.5** G/Hour

Concentration **221** Mg/M3

Breakdown of Particulate Sample

Rinse **52.1%**

XAD-2 **8.1%**

Filter **39.8%**

Total **100%**

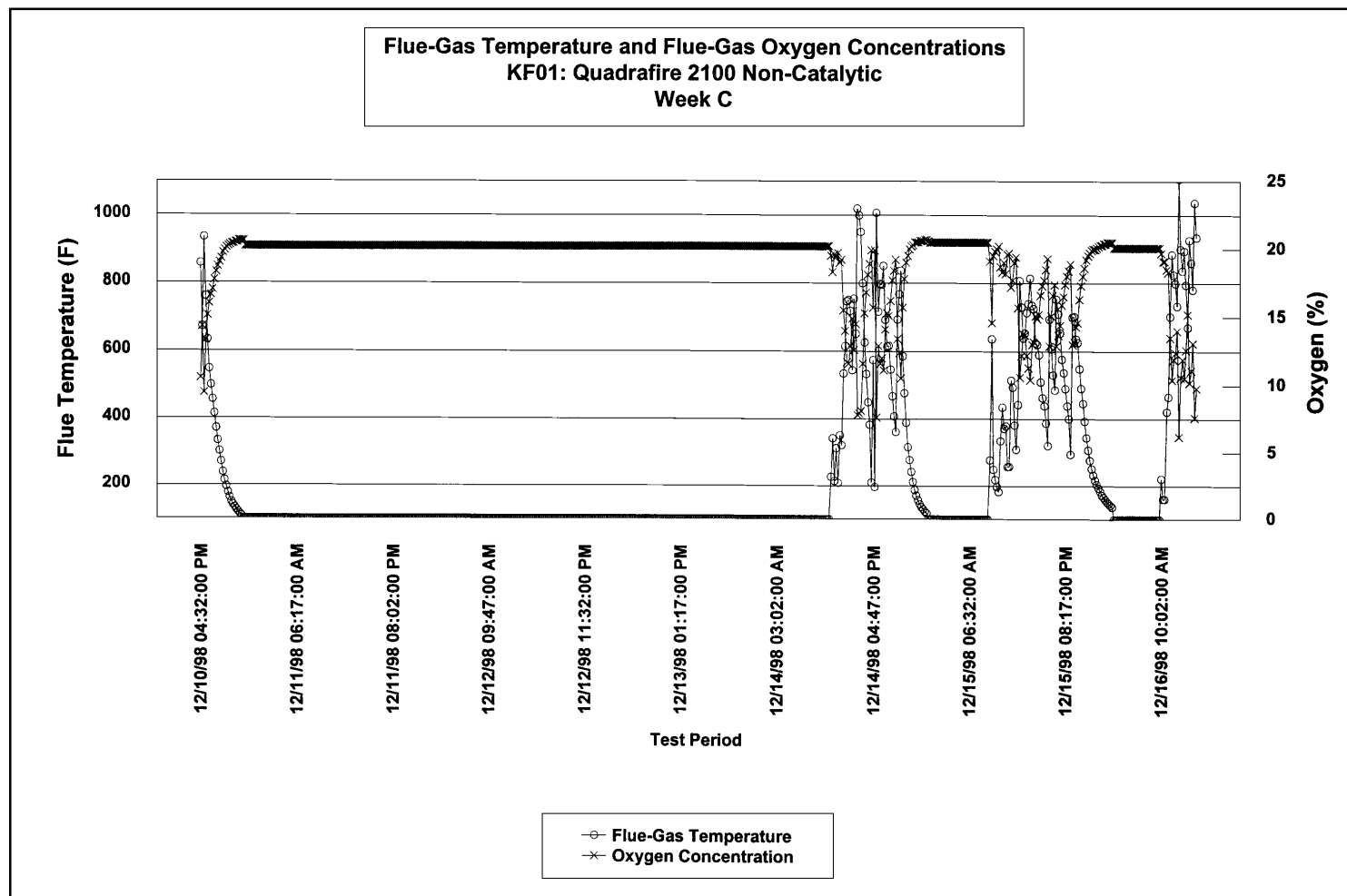
Average Flue-Gas Concentrations

Oxygen (AWES) **16.29** Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Klamath Falls, Oregon USA
Test Run Number: **Week A**
Test Period Start Date/Time: 11/08/98 12:01:54 PM
Test Period End Date/Time: 11/15/98 11:47:00 AM
Stove Model Tested: **KF02: Pacific Energy Standard 27 Non-Catalytic**
Stove Type: New Tech/Non-Catalytic

Time

Total Test Period **168.00** Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F) **168** Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F) **100%**

ESS Settings

ESS Sampling Rate **1.124** L/Minute
Sample Cycle Duration **15.00** Minutes
Sample Time Per Sample Cycle **120** Seconds

Fuel

Total Fuel Used **196.4** KG With Moisture
Average Fuel Moisture **20.8%** Percent Dry Basis
Total Fuel Burned **162.6** KG Dry
Average Burn Rate During Stove Operation **1.0** KG/Hour (dry)

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar) **448** Degrees F **231** Degrees C
Test Facility Ambient Temperature **67** Degrees F **19** Degrees C

Particulate Emissions

Emission Factor **5.7** G/Kg
Emission Rate **5.5** G/Hour
Concentration **362** Mg/M3

Breakdown of Particulate Sample

Rinse	56.2%
XAD-2	18.8%
Filter	24.9%
Total	100%

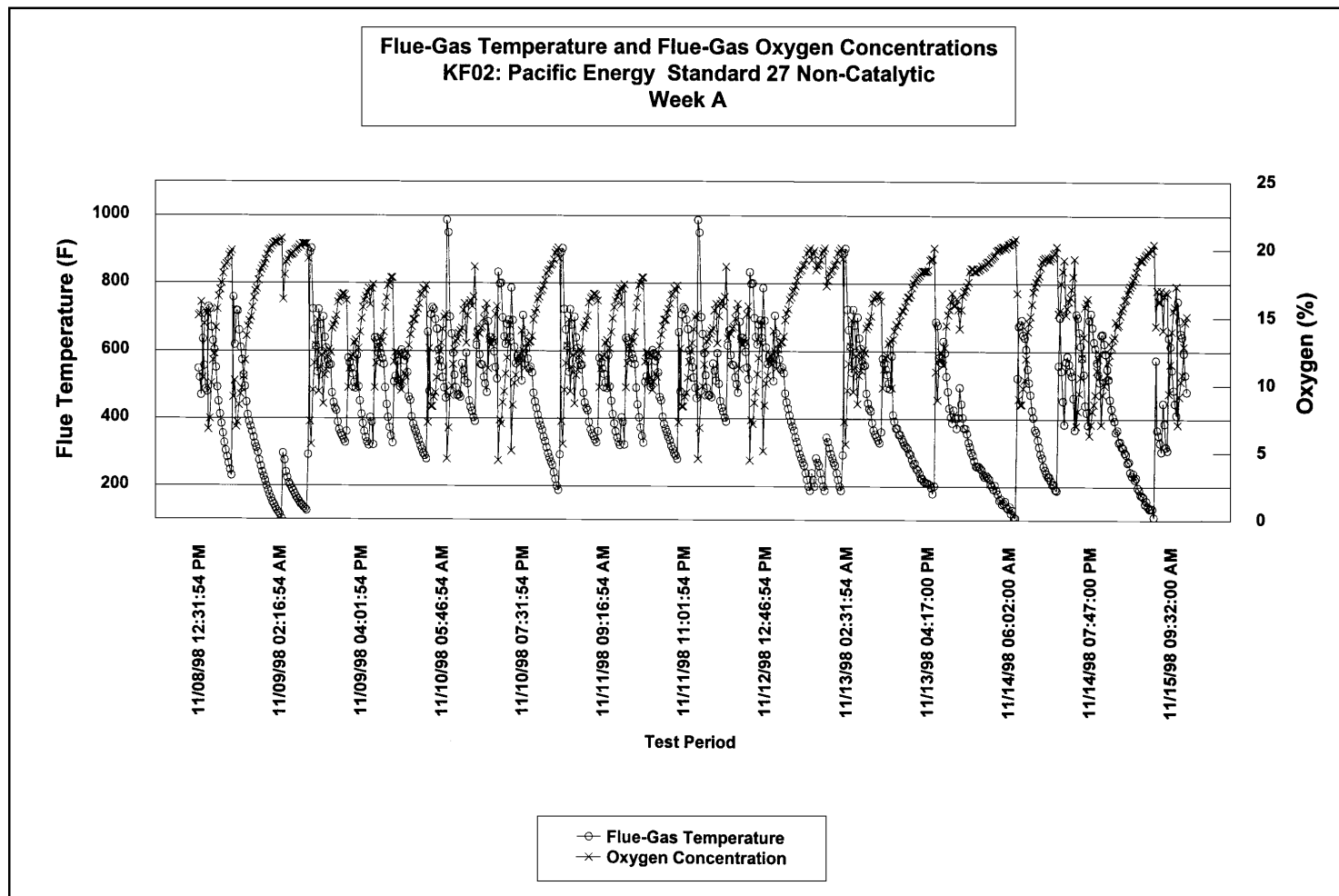
Average Flue-Gas Concentrations

Oxygen (AWES) **14.53** Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Klamath Falls, Oregon USA
Test Run Number: **Week B**
Test Period Start Date/Time: 12/02/98 09:47:00 AM
Test Period End Date/Time: 12/09/98 09:32:00 AM
Stove Model Tested: **KF02: Pacific Energy Standard 27 Non-Catalytic**
Stove Type: New Tech/Non-Catalytic

Time

Total Test Period 168.00 Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F) 163.75 Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F) 97.5%

ESS Settings

ESS Sampling Rate 1.124 L/Minute
Sample Cycle Duration 15.00 Minutes
Sample Time Per Sample Cycle 120 Seconds

Fuel

Total Fuel Used 207.6 KG With Moisture
Average Fuel Moisture 21.5% Percent Dry Basis
Total Fuel Burned 170.9 KG Dry
Average Burn Rate During Stove Operation 1.0 KG/Hour (dry)

Average Flue-Gas Concentrations

Oxygen (AWES) 14.52 Percent

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar) 412 Degrees F 211 Degrees C
Test Facility Ambient Temperature 57 Degrees F 14 Degrees C

Particulate Emissions

Emission Factor 5.1 G/Kg
Emission Rate 5.3 G/Hour
Concentration 326 Mg/M3

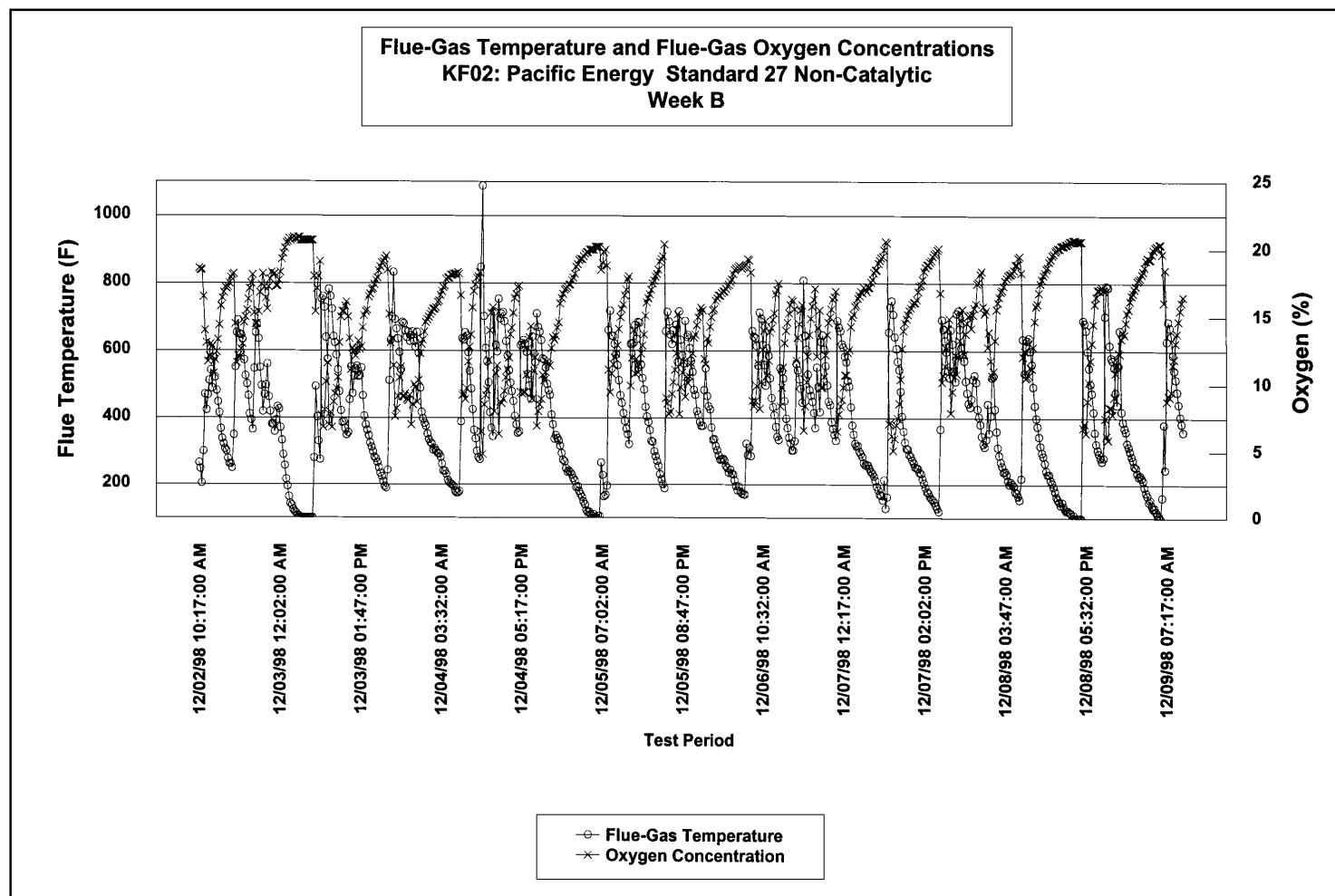
Breakdown of Particulate Sample

Rinse	40.4%
XAD-2	26.4%
Filter	33.3%
Total	100%

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Klamath Falls, Oregon USA
Test Run Number: **Week C**
Test Period Start Date/Time: 12/09/98 11:02:01 AM
Test Period End Date/Time: 12/16/98 10:45:00 AM
Stove Model Tested: **KF02: Pacific Energy Standard 27 Non-Catalytic**
Stove Type: New Tech/Non-Catalytic

Time

Total Test Period **168.00** Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F) **133.75** Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F) **79.6%**

ESS Settings

ESS Sampling Rate **1.124** L/Minute
Sample Cycle Duration **15.00** Minutes
Sample Time Per Sample Cycle **120** Seconds

Fuel

Total Fuel Used **142.5** KG With Moisture
Average Fuel Moisture **19.6%** Percent Dry Basis
Total Fuel Burned **119.1** KG Dry
Average Burn Rate During Stove Operation **0.9** KG/Hour (dry)

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar) **374** Degrees F **190** Degrees C
Test Facility Ambient Temperature **54** Degrees F **12** Degrees C

Particulate Emissions

Emission Factor **5.5** G/Kg
Emission Rate **4.9** G/Hour
Concentration **317** Mg/M3

Breakdown of Particulate Sample

Rinse	65.7%
XAD-2	11.3%
Filter	23.0%
Total	100%

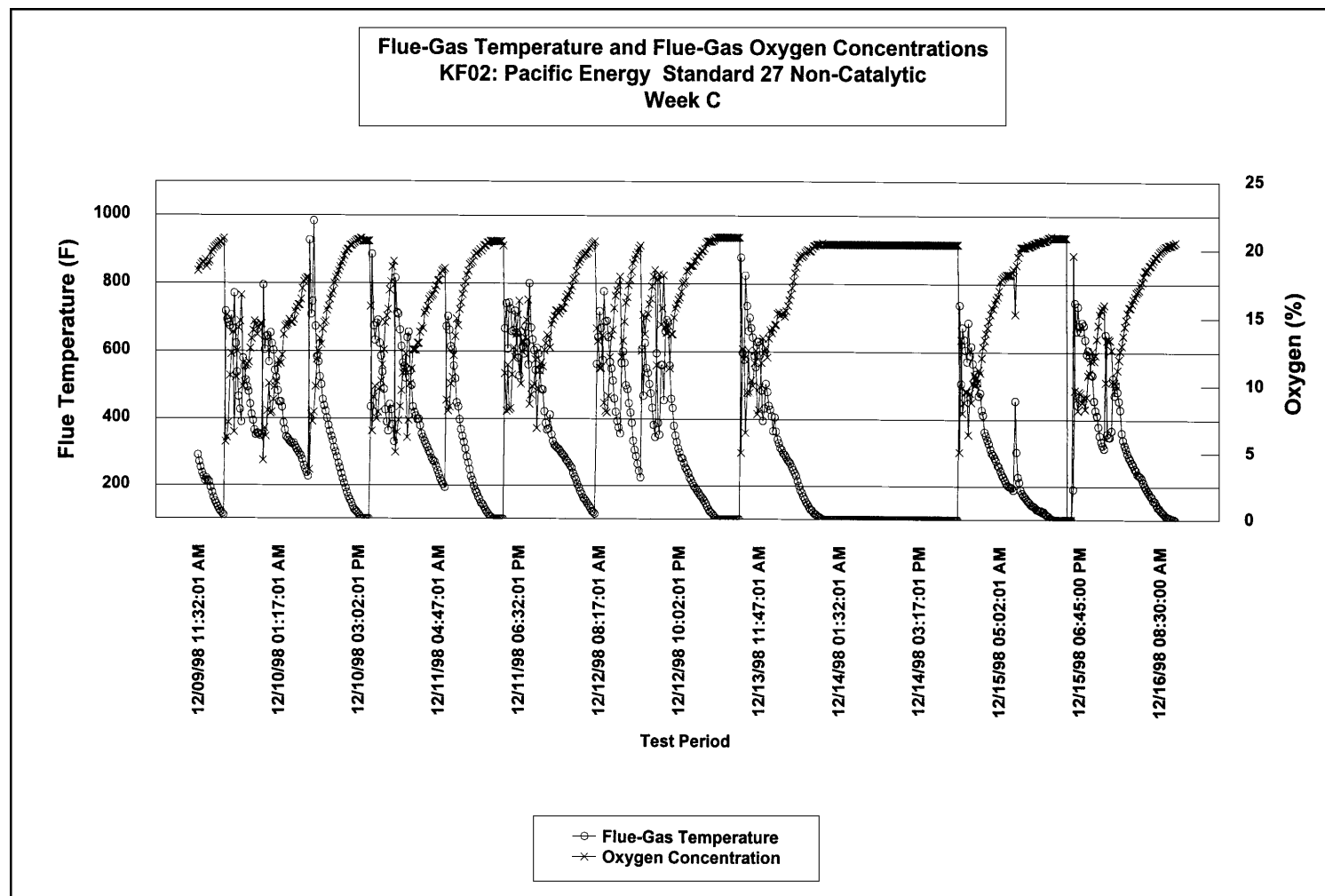
Average Flue-Gas Concentrations

Oxygen (AWES) **15.15** Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Klamath Falls, Oregon USA
Test Run Number: **Week B**
Test Period Start Date/Time: 11/22/98 12:01:56 PM
Test Period End Date/Time: 11/29/98 11:46:56 AM
Stove Model Tested: **KF03: Haughs 171E Non-Catalytic**
Stove Type: New Tech/Non-Catalytic

Time

Total Test Period 168.00 Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F) 142.75 Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F) 85.0%

ESS Settings

ESS Sampling Rate 1.038 L/Minute
Sample Cycle Duration 15.00 Minutes
Sample Time Per Sample Cycle 120 Seconds

Fuel

Total Fuel Used 133.8 KG With Moisture
Average Fuel Moisture 14.5% Percent Dry Basis
Total Fuel Burned 116.8 KG Dry
Average Burn Rate During Stove Operation 0.8 KG/Hour (dry)

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar) 430 Degrees F 221 Degrees C
Test Facility Ambient Temperature 75 Degrees F 24 Degrees C

Particulate Emissions

Emission Factor 3.7 G/Kg
Emission Rate 3.0 G/Hour
Concentration 123 Mg/M3

Breakdown of Particulate Sample

Rinse	41.4%
XAD-2	20.9%
Filter	37.7%
Total	100%

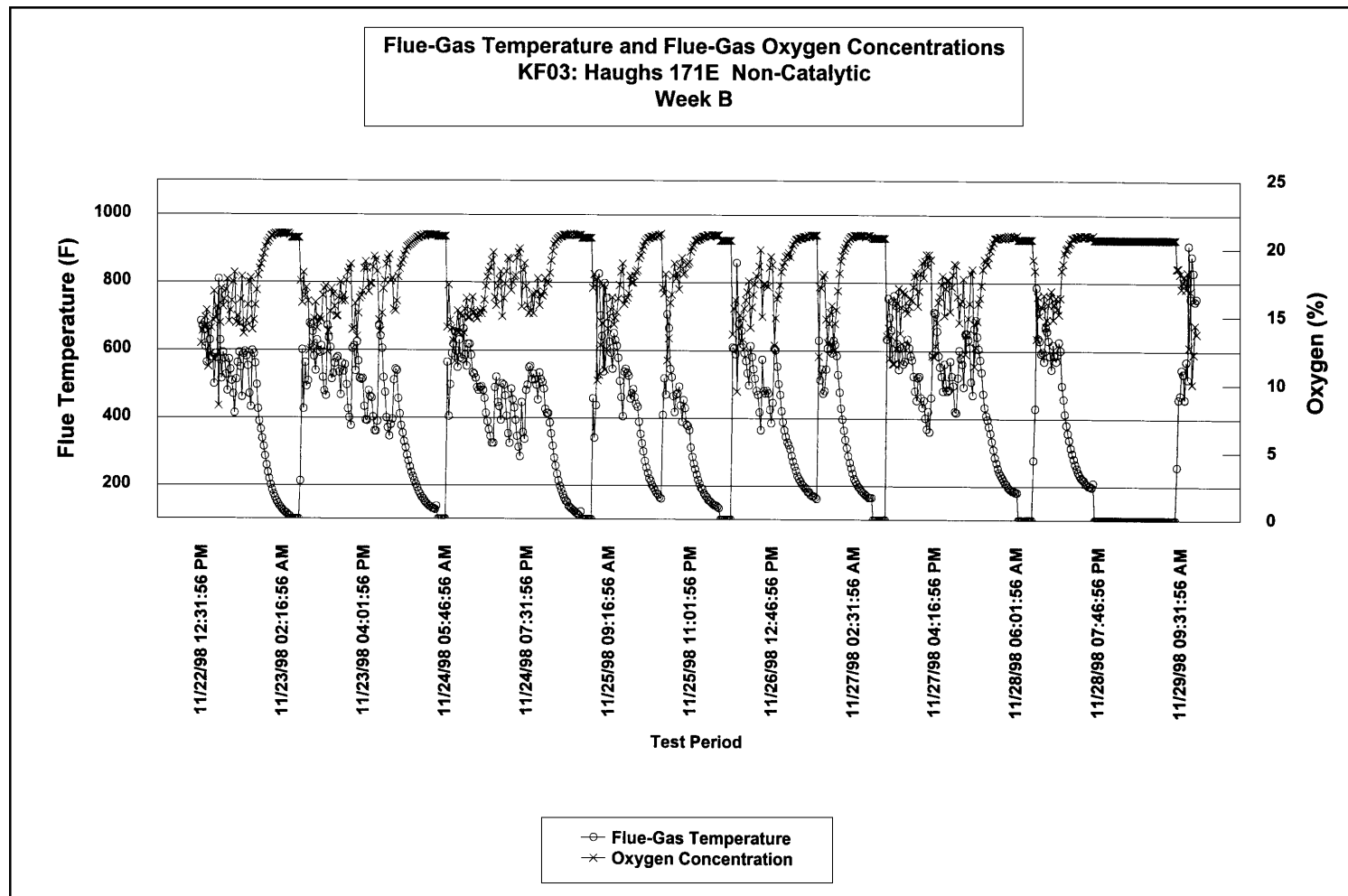
Average Flue-Gas Concentrations

Oxygen (AWES) 17.58 Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Klamath Falls, Oregon USA
Test Run Number: **Week C**
Test Period Start Date/Time: 12/06/98 12:17:02 PM
Test Period End Date/Time: 12/13/98 12:02:02 PM
Stove Model Tested: **KF03: Haughs 171E Non-Catalytic**
Stove Type: New Tech/Non-Catalytic

Time

Total Test Period	168.00	Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F)	160	Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F)	95.2%	

ESS Settings

ESS Sampling Rate	1.038	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Fuel

Total Fuel Used	185.8	KG With Moisture
Average Fuel Moisture	18.8%	Percent Dry Basis
Total Fuel Burned	139.6	KG Dry
Average Burn Rate During Stove Operation	0.9	KG/Hour (dry)

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	475	Degrees F	246	Degrees C
Test Facility Ambient Temperature	71	Degrees F	22	Degrees C

Particulate Emissions

Emission Factor	1.9	G/Kg
Emission Rate	1.7	G/Hour
Concentration	85	Mg/M3

Breakdown of Particulate Sample

Rinse	78.2%
XAD-2	15.2%
Filter	6.5%
Total	100%

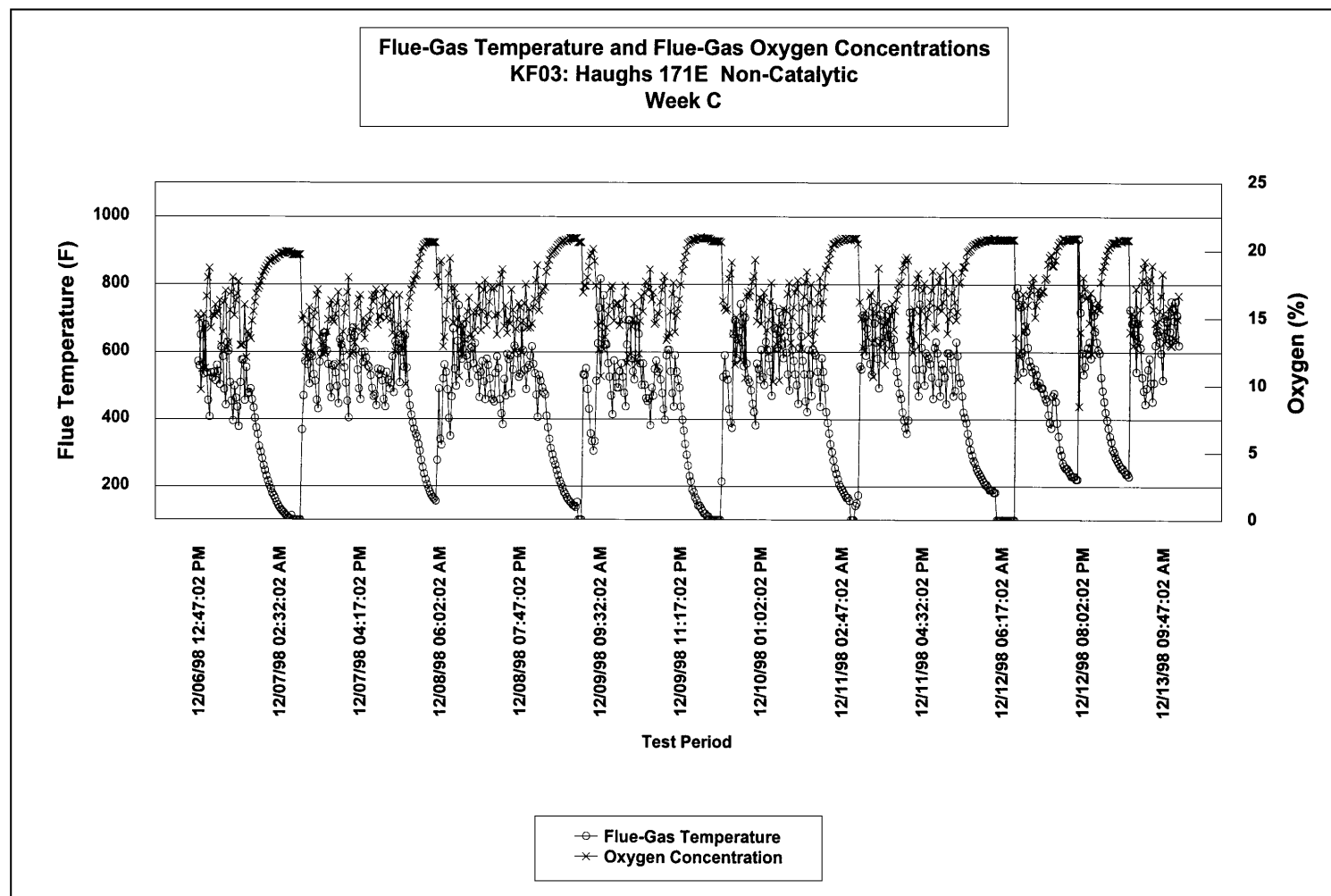
Average Flue-Gas Concentrations

Oxygen (AWES)	16.52	Percent
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Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Klamath Falls, Oregon USA
Test Run Number: **Week A**
Test Period Start Date/Time: 11/14/98 12:32:01 PM
Test Period End Date/Time: 11/21/98 12:17:01 PM
Stove Model Tested: **KF04: Earthstove 1003-C**
Stove Type: Catalytic

Time

Total Test Period **168.00** Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F) **168** Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F) **100.0%**

ESS Settings

ESS Sampling Rate **1.042** L/Minute
Sample Cycle Duration **15.00** Minutes
Sample Time Per Sample Cycle **120** Seconds

Fuel

Total Fuel Used **184.4** KG With Moisture
Average Fuel Moisture **21.6%** Percent Dry Basis
Total Fuel Burned **151.6** KG Dry
Average Burn Rate During Stove Operation **0.9** KG/Hour (dry)

Average Flue-Gas Concentrations

Oxygen (AWES) **15.42** Percent

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar) **398** Degrees F **203** Degrees C
Test Facility Ambient Temperature **75** Degrees F **24** Degrees C

Particulate Emissions

Emission Factor **17.5** G/Kg
Emission Rate **15.8** G/Hour
Concentration **926** Mg/M3

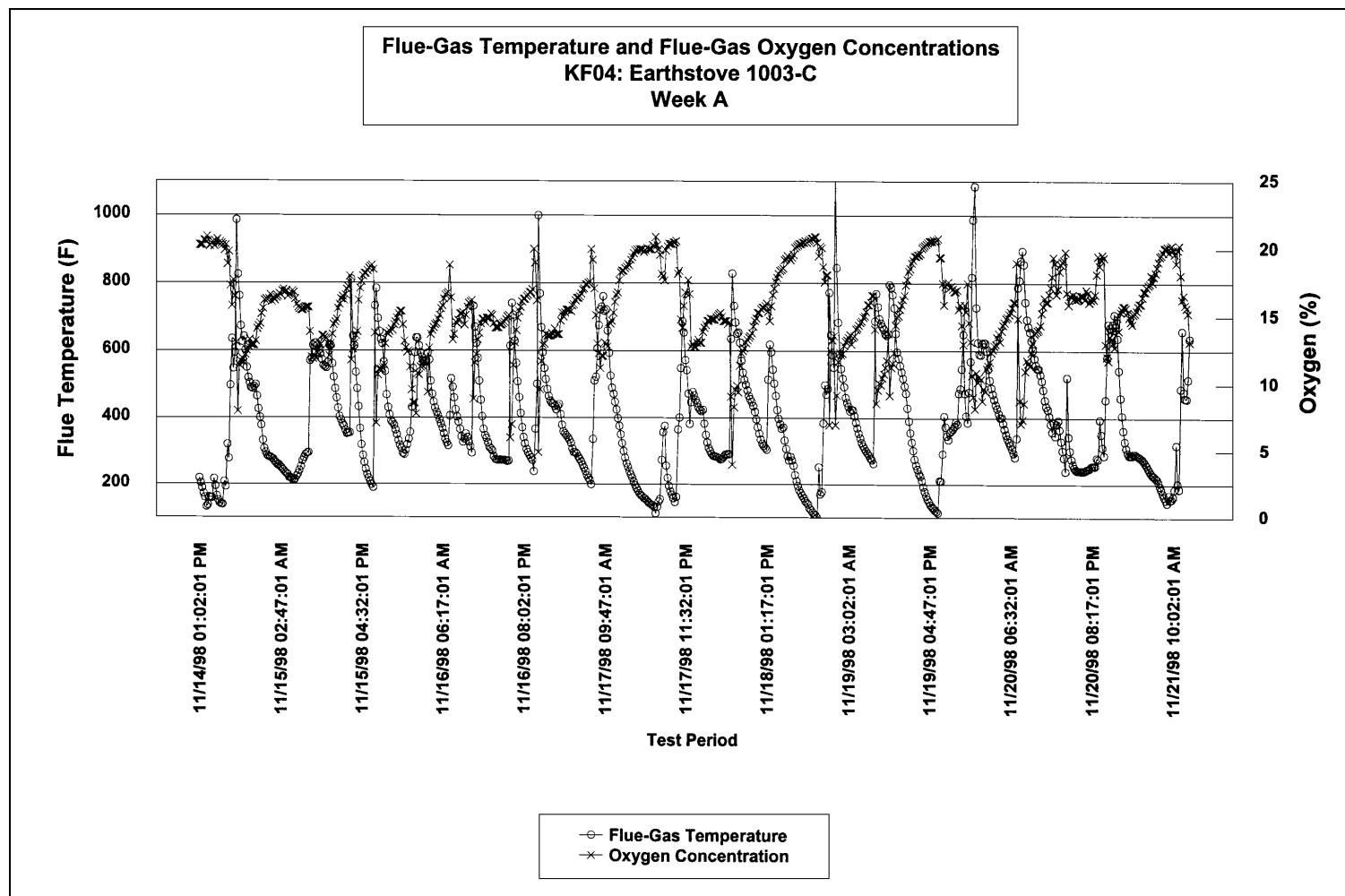
Breakdown of Particulate Sample

Rinse	35.6%
XAD-2	34.6%
Filter	29.8%
Total	100%

Test Notes:

Test Note Number 1: Stoichiometric Volume For This Test is Based on 2.0% of Fuel Carbon Generating Carbon Monoxide and 98.0% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Klamath Falls, Oregon USA
Test Run Number: **Week B**
Test Period Start Date/Time: 12/02/98 12:47:00 PM
Test Period End Date/Time: 12/09/98 11:32:00 AM
Stove Model Tested: **KF04: Earthstove 1003-C**
Stove Type: Catalytic

Time

Total Test Period	167.00	Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F)	167	Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F)	100.0%	

ESS Settings

ESS Sampling Rate	1.042	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Fuel

Total Fuel Used	212.2	KG With Moisture
Average Fuel Moisture	19.5%	Percent Dry Basis
Total Fuel Burned	177.6	KG Dry
Average Burn Rate During Stove Operation	1.1	KG/Hour (dry)

Average Flue-Gas Concentrations

Oxygen (AWES)	12.59	Percent
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Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	510	Degrees F	266	Degrees C
Test Facility Ambient Temperature	71	Degrees F	22	Degrees C

Particulate Emissions

Emission Factor	14.2	G/Kg
Emission Rate	15.1	G/Hour
Concentration	1139	Mg/M3

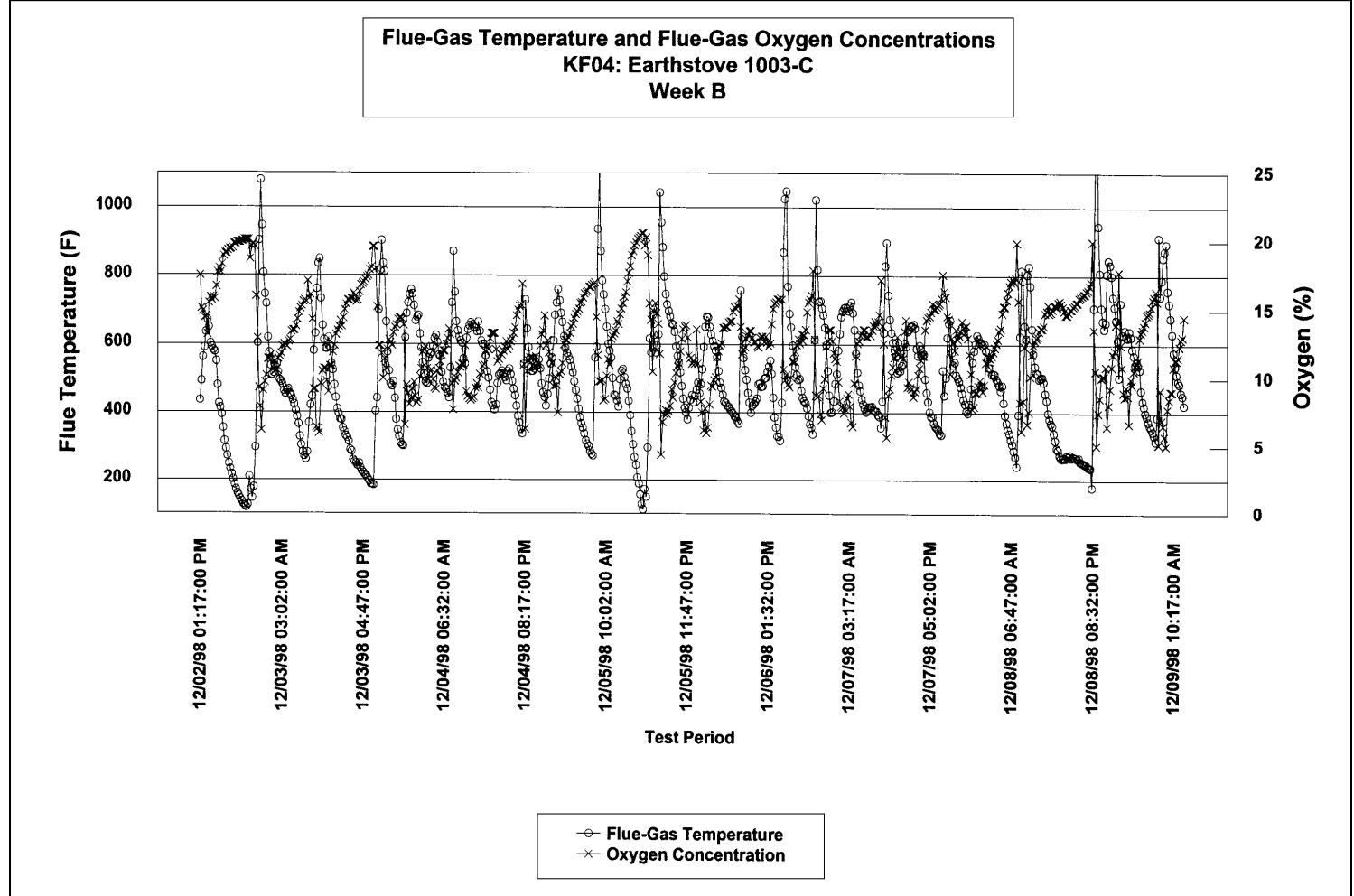
Breakdown of Particulate Sample

Rinse	27.7%
XAD-2	28.9%
Filter	43.4%
Total	100%

Test Notes:

Test Note Number 1: Stoichiometric Volume For This Test is Based on 2.0% of Fuel Carbon Generating Carbon Monoxide and 98.0% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Klamath Falls, Oregon USA
Test Run Number: **Week A**
Test Period Start Date/Time: 11/08/98 12:01:54 PM
Test Period End Date/Time: 11/15/98 11:46:54 AM
Stove Model Tested: **KF05: Pacific Energy Super Series-27 Non-Catalytic**
Stove Type: New Tech/Non-Catalytic

Time

Total Test Period **168.00** Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F) **150.75** Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F) **89.7%**

ESS Settings

ESS Sampling Rate **1.069** L/Minute
Sample Cycle Duration **15.00** Minutes
Sample Time Per Sample Cycle **120** Seconds

Fuel

Total Fuel Used **137.7** KG With Moisture
Average Fuel Moisture **10.4%** Percent Dry Basis
Total Fuel Burned **124.7** KG Dry
Average Burn Rate During Stove Operation **0.8** KG/Hour (dry)

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar) **446** Degrees F **230** Degrees C
Test Facility Ambient Temperature **75** Degrees F **24** Degrees C

Particulate Emissions

Emission Factor **5.2** G/Kg
Emission Rate **4.3** G/Hour
Concentration **240** Mg/M3

Breakdown of Particulate Sample

Rinse	47.7%
XAD-2	29.9%
Filter	22.3%
Total	100%

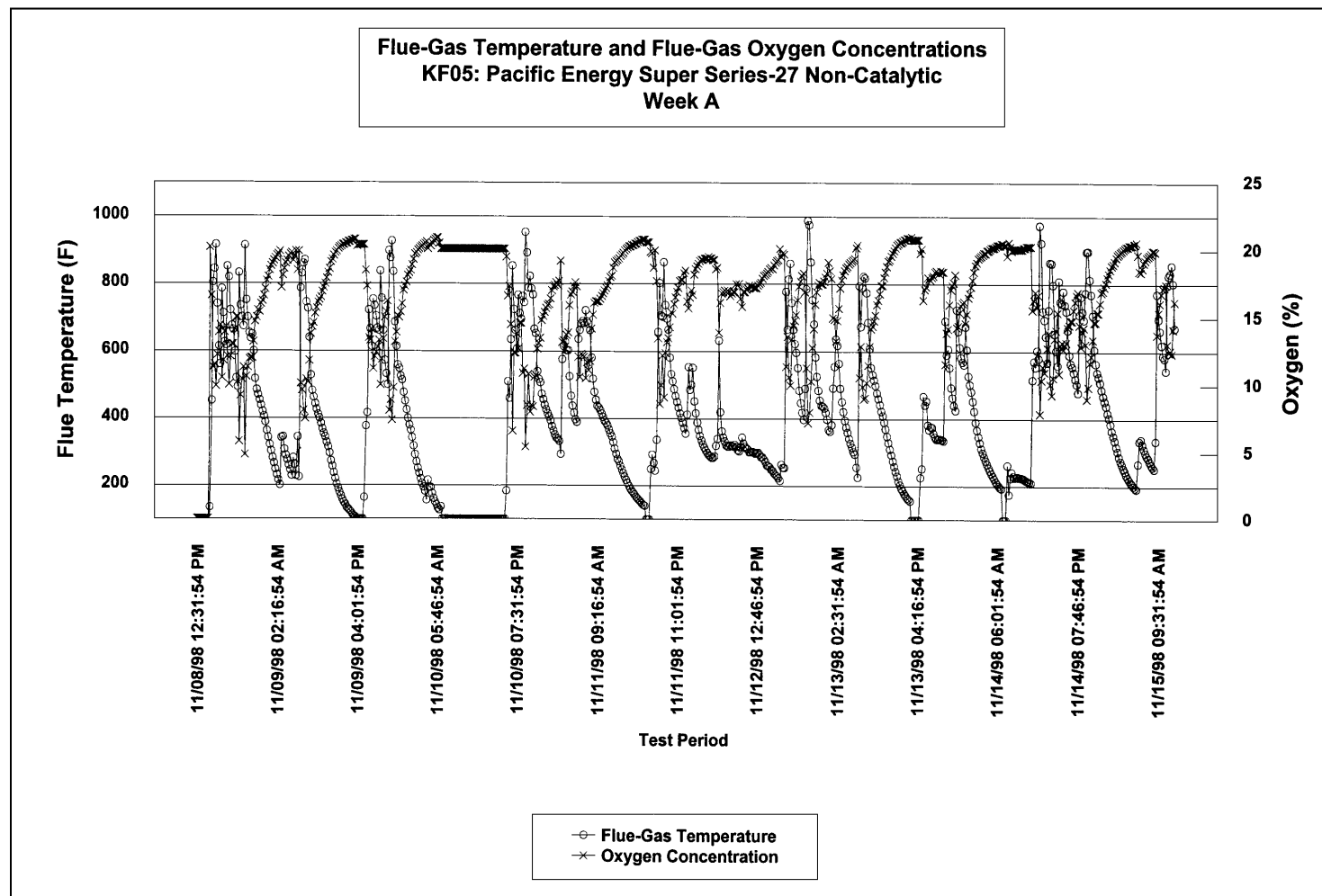
Average Flue-Gas Concentrations

Oxygen (AWES) **16.28** Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Klamath Falls, Oregon USA

Test Run Number: Week B

Test Period Start Date/Time: 11/22/98 12:01:55 PM

Test Period End Date/Time: 11/25/98 06:16:55 PM

Stove Model Tested: **KF05: Pacific Energy Super Series-27 Non-Catalytic**

Stove Type: New Tech/Non-Catalytic

Time

Total Test Period **78.50** Hours

Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F) **75.5** Hours

Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F) **96.2%**

ESS Settings

ESS Sampling Rate **1.069** L/Minute

Sample Cycle Duration **15.00** Minutes

Sample Time Per Sample Cycle **120** Seconds

Fuel

Total Fuel Used **70.7** KG With Moisture

Average Fuel Moisture **9.8%** Percent Dry Basis

Total Fuel Burned **64.4** KG Dry

Average Burn Rate During Stove Operation **0.9** KG/Hour (dry)

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar) **404** Degrees F **207** Degrees C

Test Facility Ambient Temperature **74** Degrees F **23** Degrees C

Particulate Emissions

Emission Factor **7.2** G/Kg

Emission Rate **6.1** G/Hour

Concentration **300** Mg/M3

Breakdown of Particulate Sample

Rinse **66.0%**

XAD-2 **12.7%**

Filter **21.3%**

Total **100%**

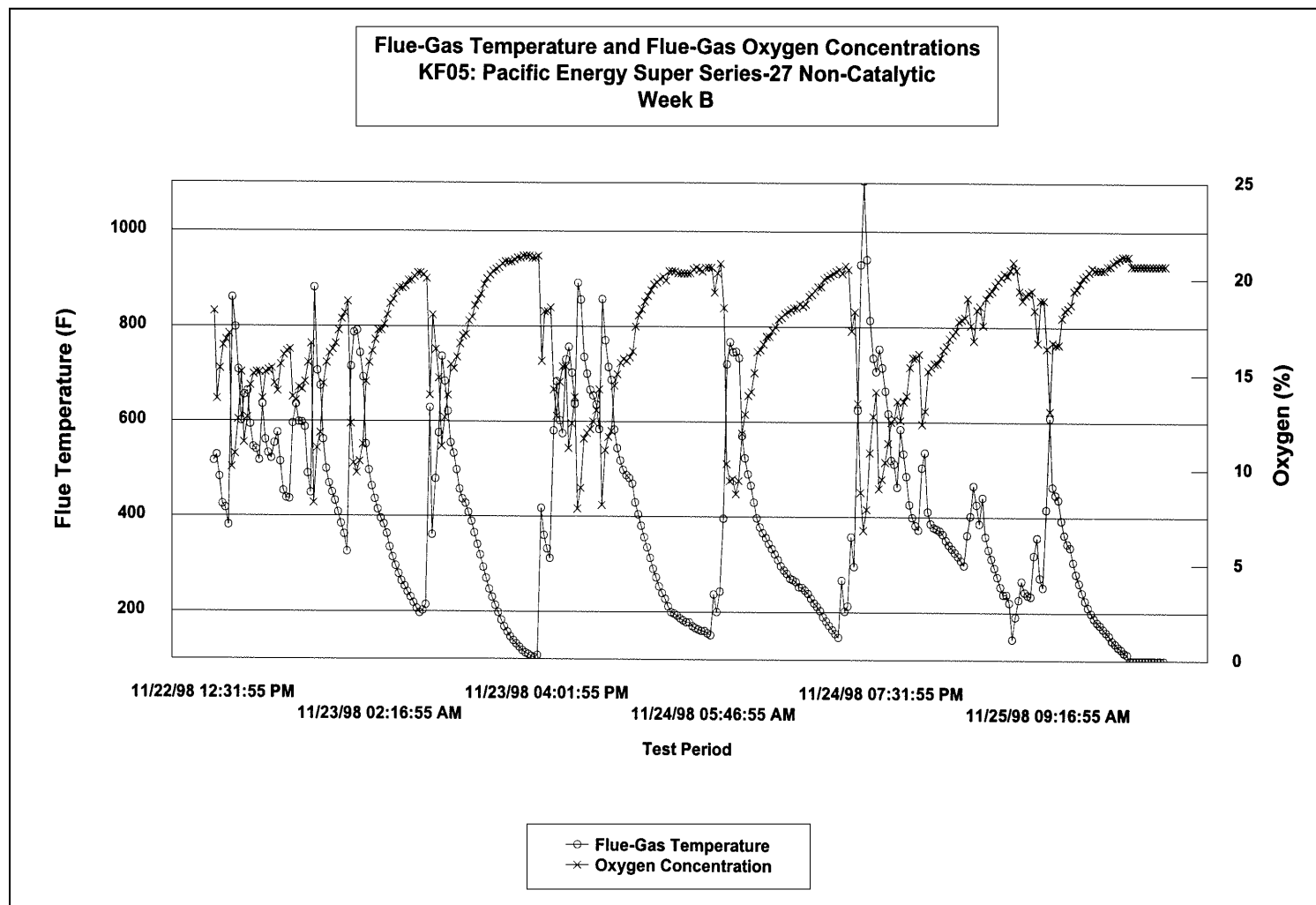
Average Flue-Gas Concentrations

Oxygen (AWES) **16.73** Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Klamath Falls, Oregon USA
Test Run Number: **Week C**
Test Period Start Date/Time: 12/08/98 12:17:01 PM
Test Period End Date/Time: 12/15/98 12:02:01 PM
Stove Model Tested: **KF05: Pacific Energy Super Series-27 Non-Catalytic**
Stove Type: New Tech/Non-Catalytic

Time

Total Test Period **168.00** Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F) **153** Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F) **91.1%**

ESS Settings

ESS Sampling Rate **1.069** L/Minute
Sample Cycle Duration **15.00** Minutes
Sample Time Per Sample Cycle **120** Seconds

Fuel

Total Fuel Used **172.2** KG With Moisture
Average Fuel Moisture **11.3%** Percent Dry Basis
Total Fuel Burned **154.7** KG Dry
Average Burn Rate During Stove Operation **1.0** KG/Hour (dry)

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar) **470** Degrees F **243** Degrees C
Test Facility Ambient Temperature **63** Degrees F **17** Degrees C

Particulate Emissions

Emission Factor **2.8** G/Kg
Emission Rate **2.8** G/Hour
Concentration **147** Mg/M3

Breakdown of Particulate Sample

Rinse	38.5%
XAD-2	25.8%
Filter	35.7%
Total	100%

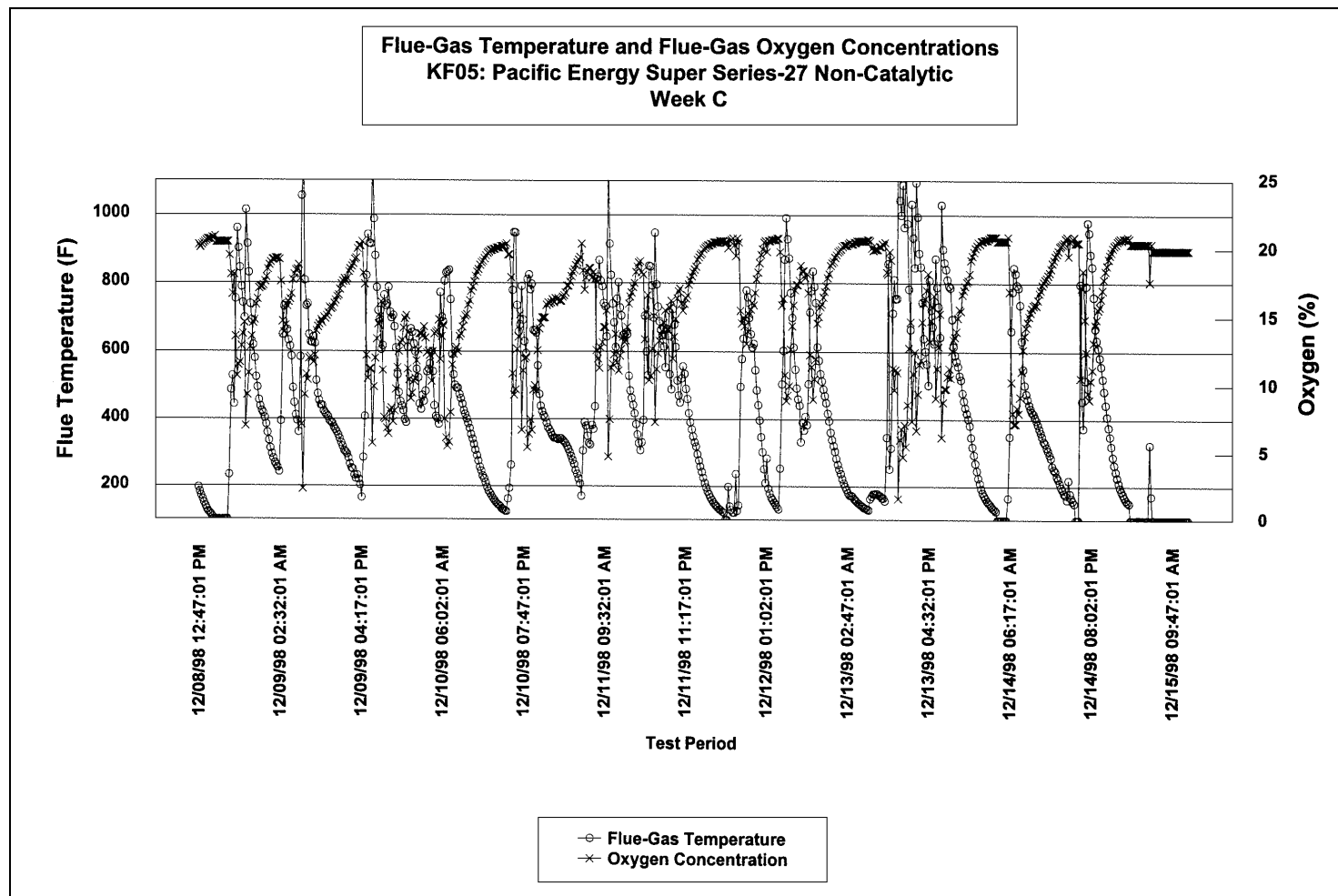
Average Flue-Gas Concentrations

Oxygen (AWES) **15.71** Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Klamath Falls, Oregon USA
Test Run Number: **Week A**
Test Period Start Date/Time: 11/10/98 12:17:00 PM
Test Period End Date/Time: 11/17/98 12:02:00 PM
Stove Model Tested: **KF06: Waterford 104.MKII**
Stove Type: New Tech/Non-Catalytic

Time

Total Test Period **168.00** Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F) **168** Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F) **100.0%**

ESS Settings

ESS Sampling Rate **1.145** L/Minute
Sample Cycle Duration **15.00** Minutes
Sample Time Per Sample Cycle **120** Seconds

Fuel

Total Fuel Used **126.0** KG With Moisture
Average Fuel Moisture **11.7%** Percent Dry Basis
Total Fuel Burned **112.8** KG Dry
Average Burn Rate During Stove Operation **0.7** KG/Hour (dry)

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar) **431** Degrees F **222** Degrees C
Test Facility Ambient Temperature **77** Degrees F **25** Degrees C

Particulate Emissions

Emission Factor **6.0** G/Kg
Emission Rate **4.0** G/Hour
Concentration **295** Mg/M3

Breakdown of Particulate Sample

Rinse	47.1%
XAD-2	18.3%
Filter	34.7%
Total	100%

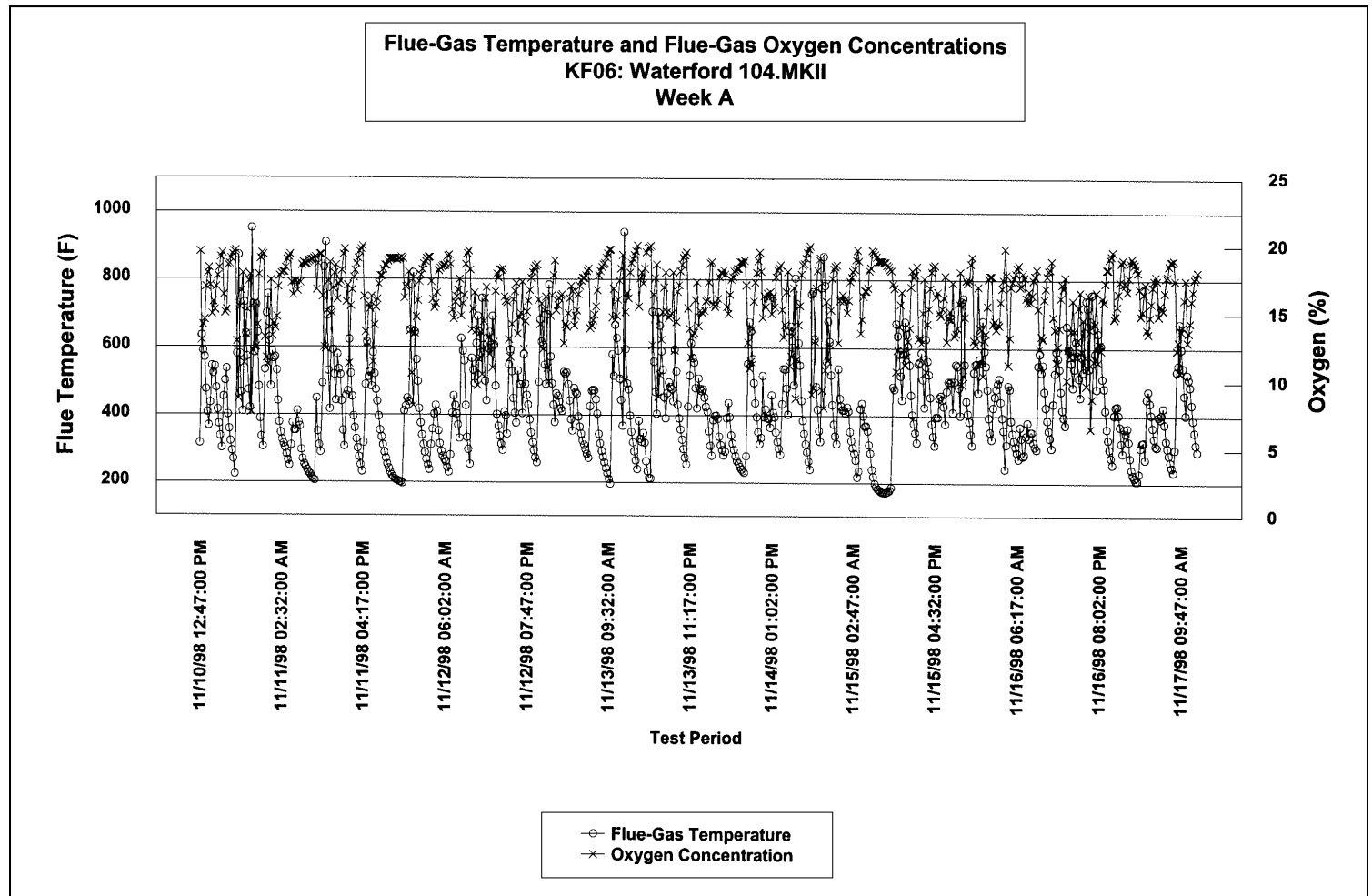
Average Flue-Gas Concentrations

Oxygen (AWES) **16.00** Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



Manufacturer: Aladdin Hearth Products

Model: DV40-Step

Date: 6/11/98

LP Gas

Alcove height 56 inch Alcove Depth 36 inches

2 foot vertical to 1 foot horizontal

3 inches to switch box - 8 inches to pipe

12 inches to Alcove 6 inches to Res. wall

Technician Bruce Davis

Supervisor Richard Sparwasser

Project No 061-S-04-5

		Interval	1	2	3	4	5	6	7	Safety Thermal Testing		8	9	10	11	12	13	14	15
Location	TC#	09:45 AM	10:15 AM	10:45 AM															
Ambient		75	75	76															
Panel A: Floor																			
0		NA	NA	NA															
1		104	109	112															
2		112	126	134															
3		NA	NA	NA															
4		101	115	122															
5		101	107	110															
6		69	72	75															
7		69	71	72															
8		70	71	72															
9		70	75	72															
10		70	71	72															
11		68	69	70															
12		69	70	72															
13		70	71	72															
14		70	71	72															
15		69	71	72															
Panel B: Rear Wall / Ceiling																			
33		144	152	151															
34		219	224	225															
35		158	162	163															
36		131	135	136															
37		217	218	219															
38		161	161	161															
Panel C: Side Wall																			
46		72	73	74															
47		74	75	76															
48		75	77	78															
49		NA	NA	NA															
50		112	117	119															
51		127	132	135															
52		106	110	112															
53		113	114	115															
54		97	99	101															
55		89	92	94															
56		129	134	136															
57		158	164	166															
58		191	196	199															
59		134	138	140															
60		123	124	125															
61		92	94	96															
62		90	92	94															
63		108	123	126															
64		137	141	142															
65		193	197	200															
66		133	137	139															
67		125	126	125															
68		90	93	95															
69		90	93	95															
70		123	127	129															
71		145	149	151															
72		166	170	172															
73		132	135	137															
74		114	113	115															
75		107	110	111															
76		98	100	101															
77		108	111	113															
78		117	119	120															
79		124	127	128															
80		145	147	148															
Miscellaneous																			
Ceiling	81	85	92	91															
Wire Ambient	2	228	230	229															
Top Switch	3	189	190	190															
Chase Top	4	100	102	104															
Chase Top	5	86	88	90															
Chase Top	6	92	94	95															
Chase Side	7	86	87	88															
Door Handl	8	118	121	120															
Flue	9	558	557	558															
Ceiling	10	145	148	148															
Ceiling	11	88	92	91															
Valve Body	20	136	136	138															

AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Klamath Falls, Oregon USA
Test Run Number: **Week A**
Test Period Start Date/Time: 11/08/98 12:01:54 PM
Test Period End Date/Time: 11/16/98 02:32:01 PM
Stove Model Tested: **KF07: Earthstove 1400HT Non-Catalytic**
Stove Type: New Tech/Non-Catalytic

Time

Total Test Period **168.25** Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F) **167.75** Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F) **99.7%**

ESS Settings

ESS Sampling Rate **1.109** L/Minute
Sample Cycle Duration **15.00** Minutes
Sample Time Per Sample Cycle **120** Seconds

Fuel

Total Fuel Used **158.5** KG With Moisture
Average Fuel Moisture **12.6%** Percent Dry Basis
Total Fuel Burned **140.8** KG Dry
Average Burn Rate During Stove Operation **0.8** KG/Hour (dry)

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar) **424** Degrees F **218** Degrees C
Test Facility Ambient Temperature **75** Degrees F **24** Degrees C

Particulate Emissions

Emission Factor **9.9** G/Kg
Emission Rate **8.3** G/Hour
Concentration **418** Mg/M3

Breakdown of Particulate Sample

Rinse	42.7%
XAD-2	19.8%
Filter	37.5%
Total	100%

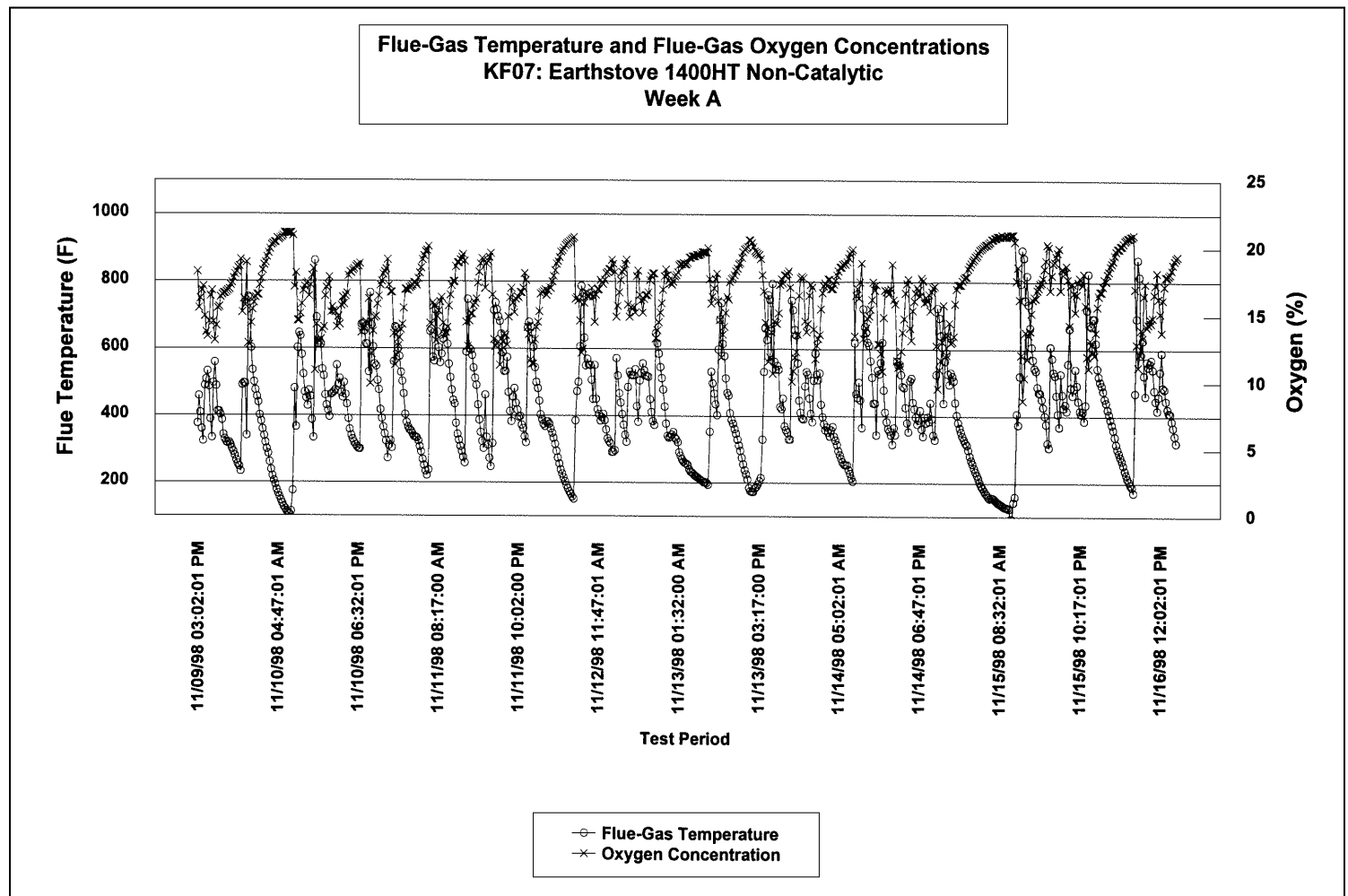
Average Flue-Gas Concentrations

Oxygen (AWES) **16.72** Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Klamath Falls, Oregon USA

Test Run Number: **Week B**

Test Period Start Date/Time: 11/22/98 12:01:54 PM

Test Period End Date/Time: 11/29/98 11:46:54 AM

Stove Model Tested: **KF07: Earthstove 1400HT Non-Catalytic**

Stove Type: New Tech/Non-Catalytic

Time

Total Test Period **168.00** Hours

Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F) **160.25** Hours

Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F) **95.4%**

ESS Settings

ESS Sampling Rate **1.109** L/Minute

Sample Cycle Duration **15.00** Minutes

Sample Time Per Sample Cycle **120** Seconds

Fuel

Total Fuel Used **133.7** KG With Moisture

Average Fuel Moisture **11.7%** Percent Dry Basis

Total Fuel Burned **119.7** KG Dry

Average Burn Rate During Stove Operation **0.7** KG/Hour (dry)

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar) **457** Degrees F **236** Degrees C

Test Facility Ambient Temperature **75** Degrees F **21** Degrees C

Particulate Emissions

Emission Factor **7.9** G/Kg

Emission Rate **5.9** G/Hour

Concentration **324** Mg/M3

Breakdown of Particulate Sample

Rinse **44.0%**

XAD-2 **22.5%**

Filter **33.5%**

Total **100%**

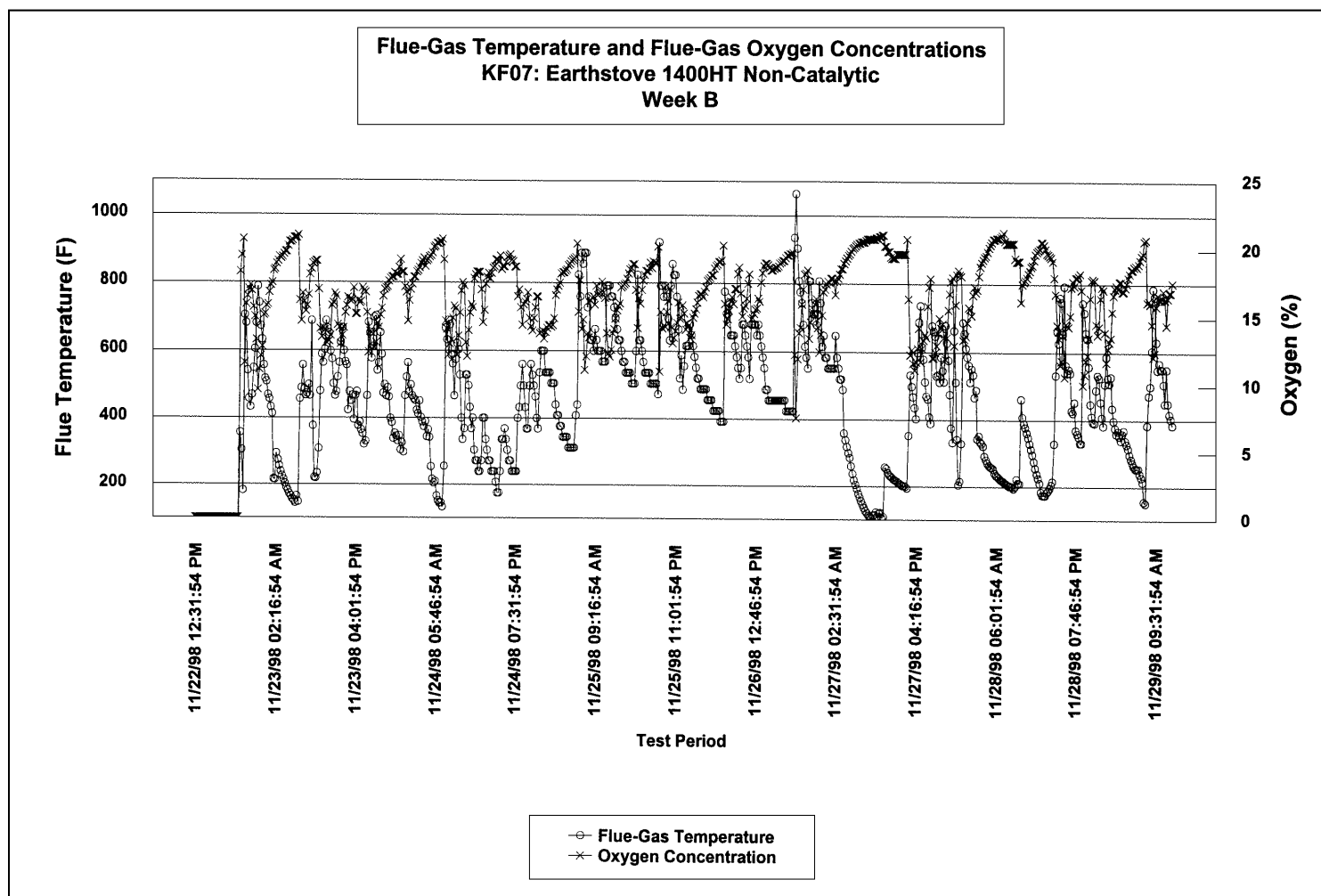
Average Flue-Gas Concentrations

Oxygen (AWES) **16.83** Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Klamath Falls, Oregon USA
Test Run Number: **Week C**
Test Period Start Date/Time: 12/06/98 12:01:54 PM
Test Period End Date/Time: 12/13/98 11:47:28 AM
Stove Model Tested: **KF07: Earthstove 1400HT Non-Catalytic**
Stove Type: New Tech/Non-Catalytic

Time

Total Test Period **168.00** Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F) **165.75** Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F) **98.7%**

ESS Settings

ESS Sampling Rate **1.109** L/Minute
Sample Cycle Duration **15.00** Minutes
Sample Time Per Sample Cycle **120** Seconds

Fuel

Total Fuel Used **225.4** KG With Moisture
Average Fuel Moisture **15.8%** Percent Dry Basis
Total Fuel Burned **194.7** KG Dry
Average Burn Rate During Stove Operation **1.2** KG/Hour (dry)

Average Flue-Gas Concentrations

Oxygen (AWES) **15.64** Percent

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar) **484** Degrees F **251** Degrees C
Test Facility Ambient Temperature **74** Degrees F **23** Degrees C

Particulate Emissions

Emission Factor **8.2** G/Kg
Emission Rate **9.7** G/Hour
Concentration **434** Mg/M3

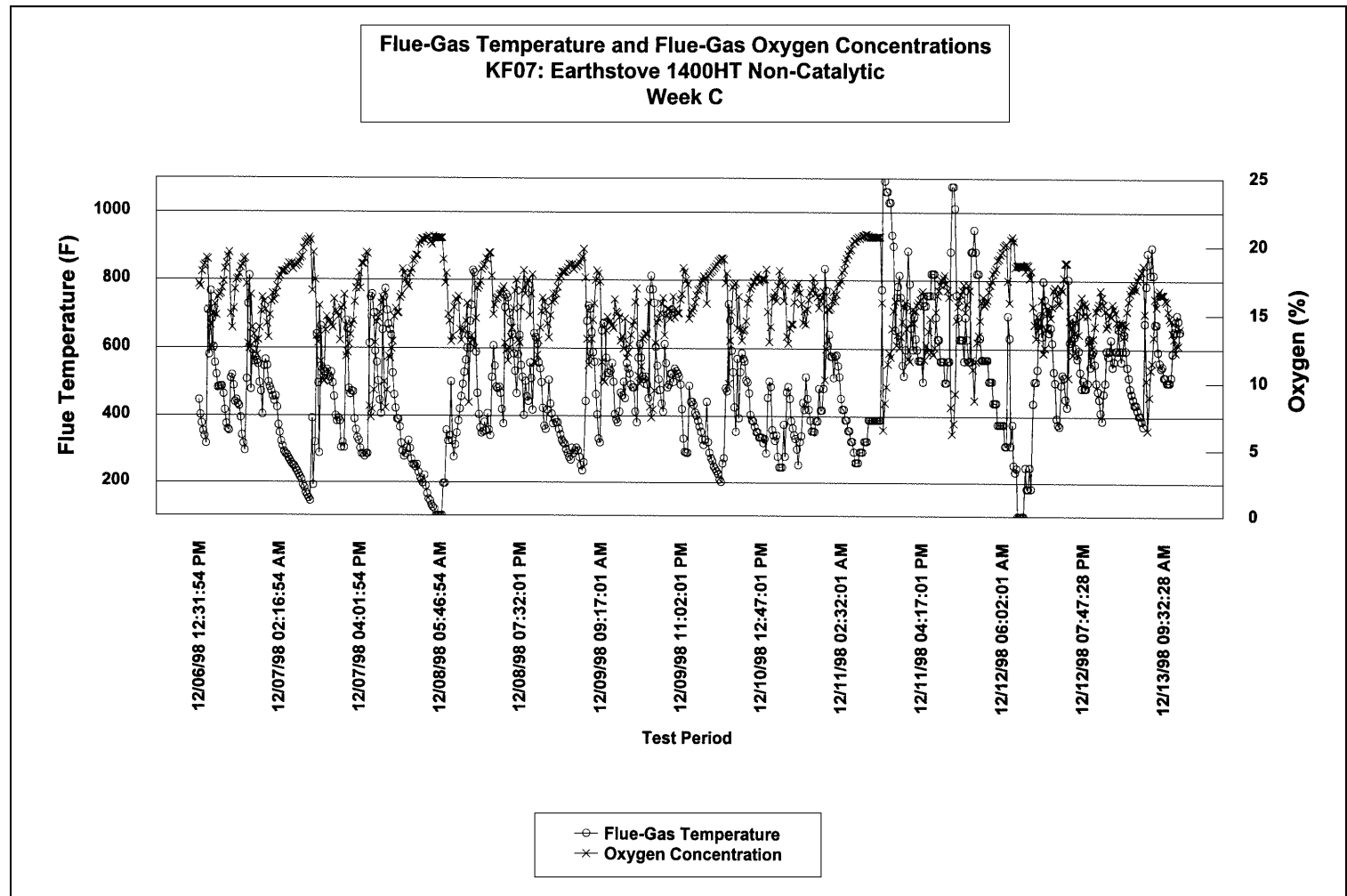
Breakdown of Particulate Sample

Rinse	49.0%
XAD-2	14.6%
Filter	36.4%
Total	100%

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Klamath Falls, Oregon USA
Test Run Number: **Week A**
Test Period Start Date/Time: 11/08/98 12:01:54 PM
Test Period End Date/Time: 11/15/98 11:46:54 AM
Stove Model Tested: **KF08: Country T-Top Non-Catalytic**
Stove Type: New Tech/Non-Catalytic

Time

Total Test Period **168.00** Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F) **168** Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F) **100.0%**

ESS Settings

ESS Sampling Rate **1.058** L/Minute
Sample Cycle Duration **15.00** Minutes
Sample Time Per Sample Cycle **120** Seconds

Fuel

Total Fuel Used **238.4** KG With Moisture
Average Fuel Moisture **26.8%** Percent Dry Basis
Total Fuel Burned **188.0** KG Dry
Average Burn Rate During Stove Operation **1.1** KG/Hour (dry)

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar) **384** Degrees F **195** Degrees C
Test Facility Ambient Temperature **79** Degrees F **26** Degrees C

Particulate Emissions

Emission Factor **8.9** G/Kg
Emission Rate **9.9** G/Hour
Concentration **395** Mg/M3

Breakdown of Particulate Sample

Rinse	55.8%
XAD-2	17.0%
Filter	27.3%
Total	100%

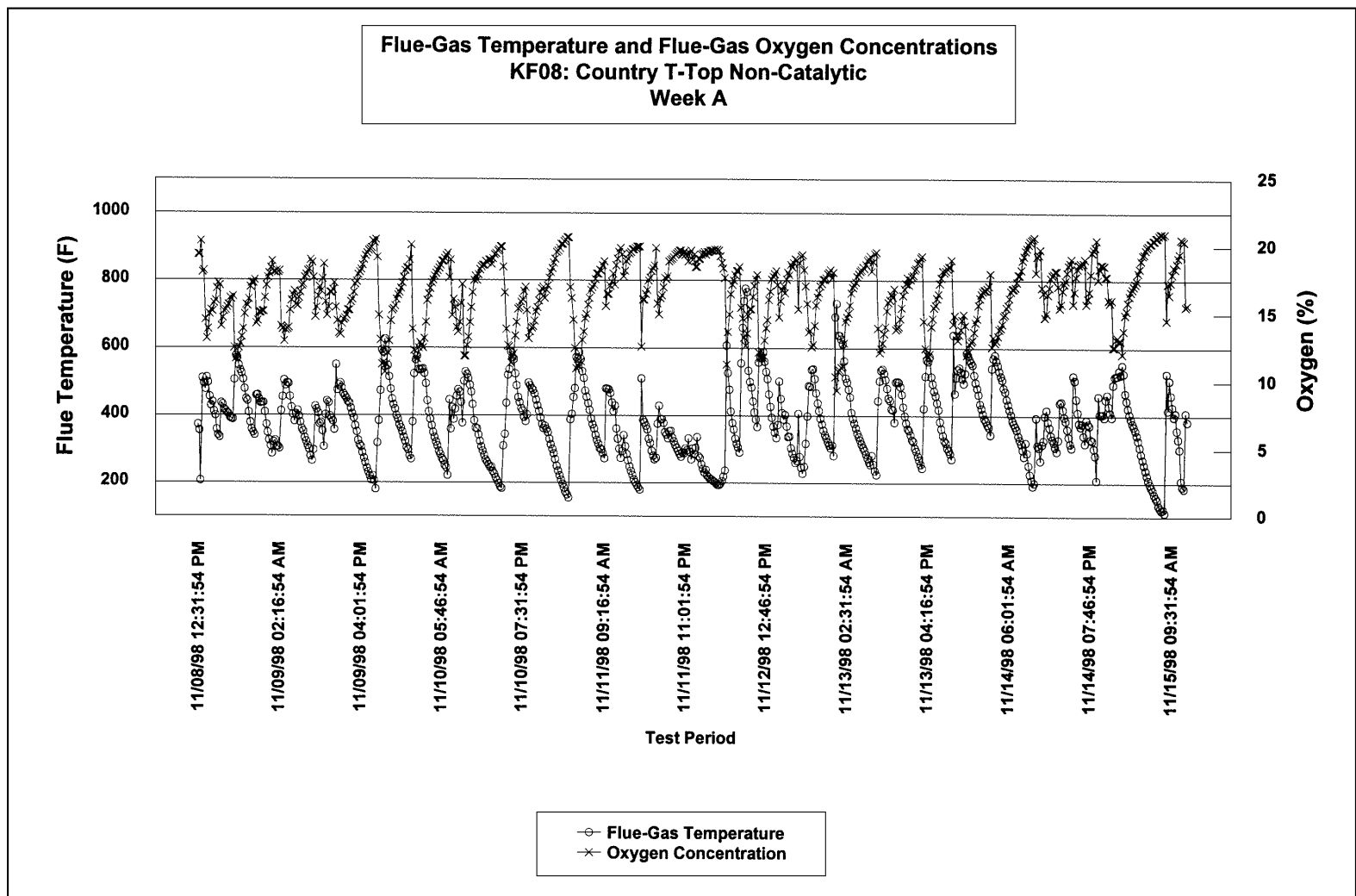
Average Flue-Gas Concentrations

Oxygen (AWES) **16.47** Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Klamath Falls, Oregon USA
Test Run Number: **Week B**
Test Period Start Date/Time: 11/22/98 12:01:53 PM
Test Period End Date/Time: 11/30/98 06:06:43 PM
Stove Model Tested: **KF08: Country T-Top Non-Catalytic**
Stove Type: New Tech/Non-Catalytic

Time

Total Test Period **172.75** Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F) **169.75** Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F) **98.3%**

ESS Settings

ESS Sampling Rate **1.058** L/Minute
Sample Cycle Duration **15.00** Minutes
Sample Time Per Sample Cycle **120** Seconds

Fuel

Total Fuel Used **237.1** KG With Moisture
Average Fuel Moisture **25.4%** Percent Dry Basis
Total Fuel Burned **189.0** KG Dry
Average Burn Rate During Stove Operation **1.1** KG/Hour (dry)

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar) **428** Degrees F **220** Degrees C
Test Facility Ambient Temperature **75** Degrees F **24** Degrees C

Particulate Emissions

Emission Factor **12.3** G/Kg
Emission Rate **13.6** G/Hour
Concentration **421** Mg/M3

Breakdown of Particulate Sample

Rinse	39.1%
XAD-2	4.3%
Filter	56.6%
Total	100%

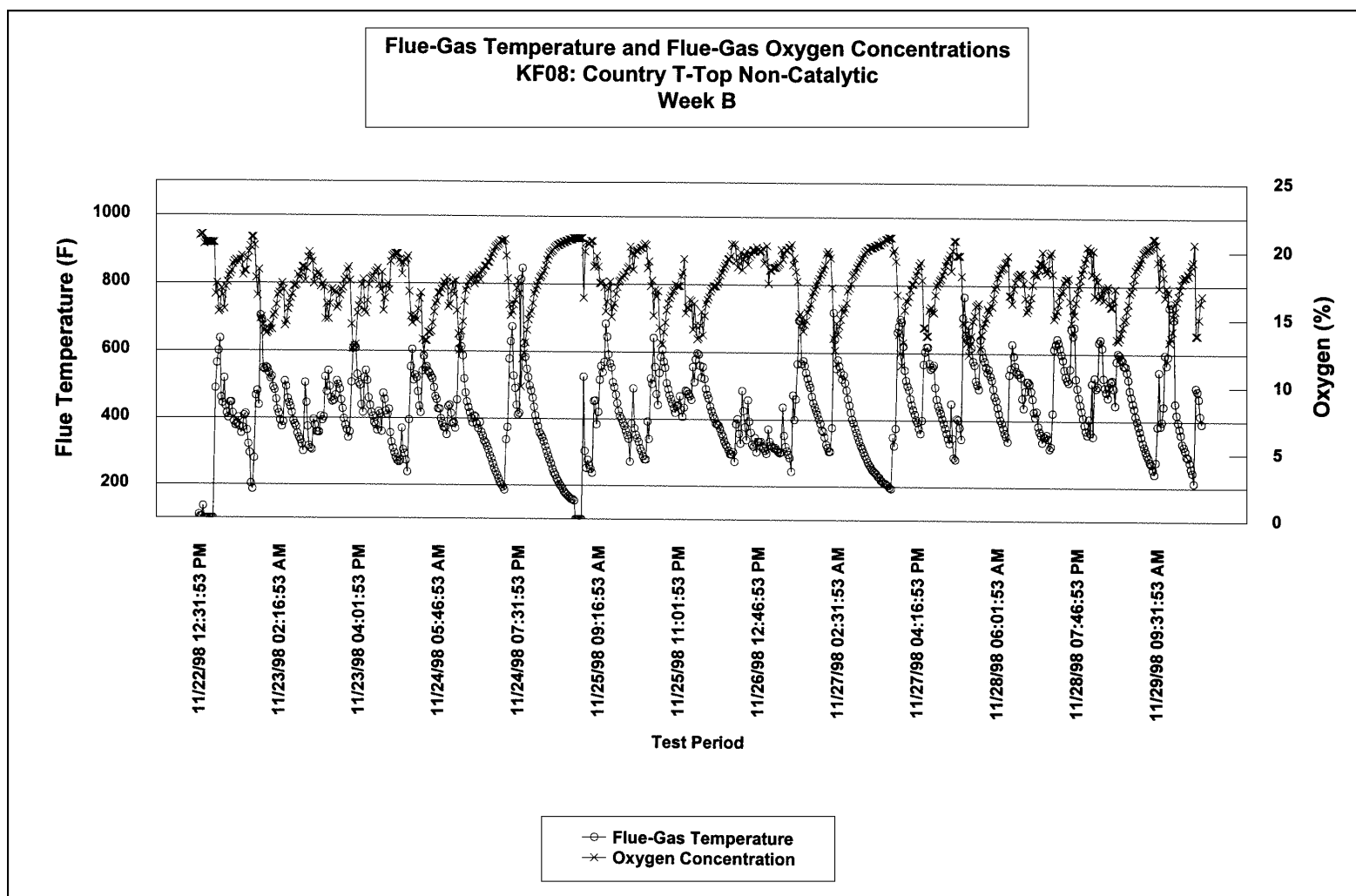
Average Flue-Gas Concentrations

Oxygen (AWES) **17.48** Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Klamath Falls, Oregon USA
Test Run Number: **Week C**
Test Period Start Date/Time: 12/05/98 07:24:15 PM
Test Period End Date/Time: 12/13/98 11:55:09 AM
Stove Model Tested: **KF08: Country T-Top Non-Catalytic**
Stove Type: New Tech/Non-Catalytic

Time

Total Test Period **171.00** Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F) **170.5** Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F) **99.7%**

ESS Settings

ESS Sampling Rate **1.058** L/Minute
Sample Cycle Duration **15.00** Minutes
Sample Time Per Sample Cycle **120** Seconds

Fuel

Total Fuel Used **257.7** KG With Moisture
Average Fuel Moisture **25.7%** Percent Dry Basis
Total Fuel Burned **205.0** KG Dry
Average Burn Rate During Stove Operation **1.2** KG/Hour (dry)

Average Flue-Gas Concentrations

Oxygen (AWES) **16.08** Percent

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar) **446** Degrees F **230** Degrees C
Test Facility Ambient Temperature **74** Degrees F **24** Degrees C

Particulate Emissions

Emission Factor **5.2** G/Kg
Emission Rate **6.3** G/Hour
Concentration **254** Mg/M3

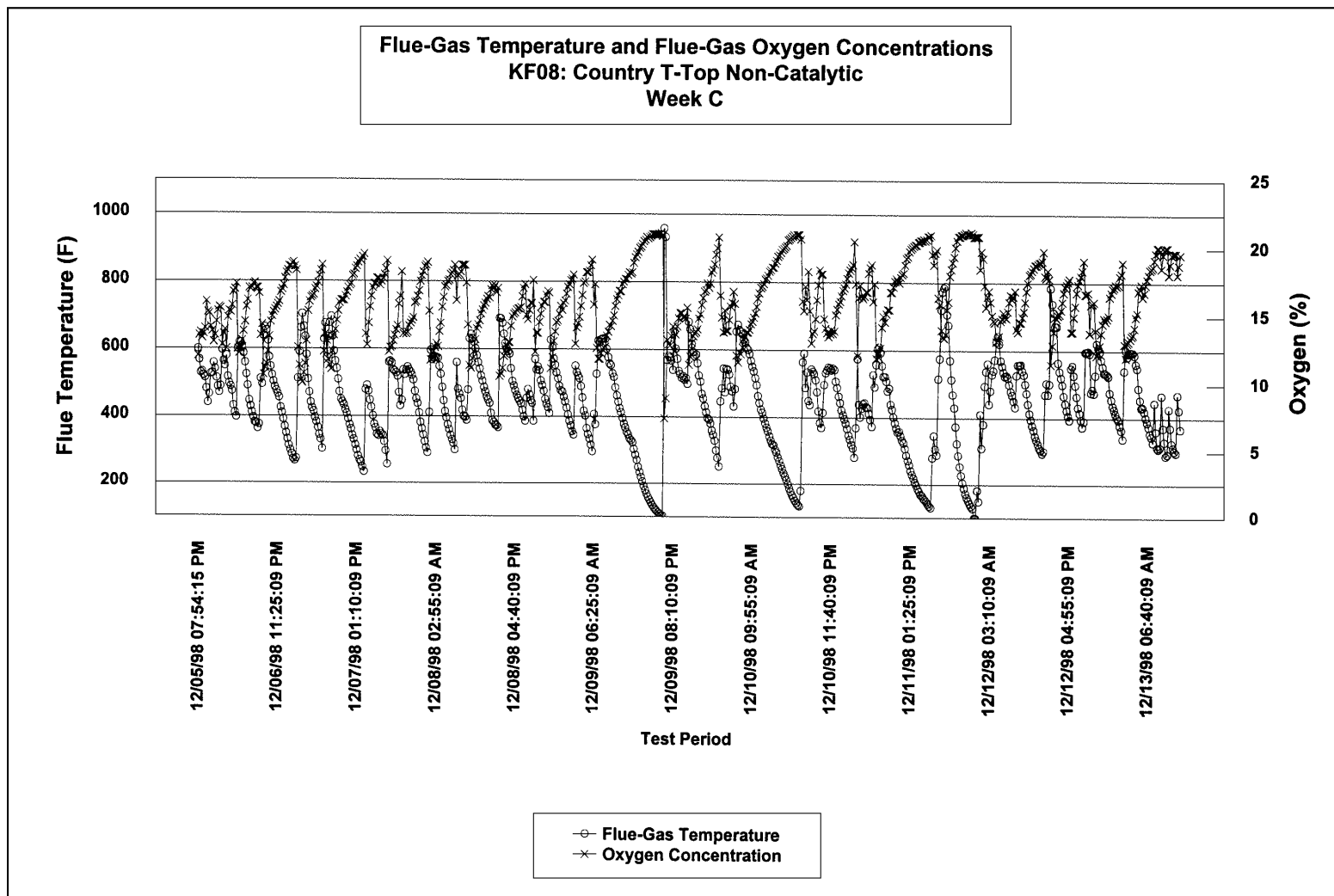
Breakdown of Particulate Sample

Rinse	57.8%
XAD-2	17.9%
Filter	24.3%
Total	100%

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Portland, Oregon USA
Test Run Number: Week A
Test Period Start Date/Time: 01/11/99 08:42:00 AM
Test Period End Date/Time: 01/19/99 12:17:58 PM
Stove Model Tested: P01: HES Trailblazer 2000-C
Stove Type: Catalytic

Time

Total Test Period 171.25 Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F) 171.25 Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F) 100.0%

ESS Settings

ESS Sampling Rate 1.058 L/Minute
Sample Cycle Duration 15.00 Minutes
Sample Time Per Sample Cycle 120 Seconds

Fuel

Total Fuel Used 260.2 KG With Moisture
Average Fuel Moisture 24.0% Percent Dry Basis
Total Fuel Burned 209.8 KG Dry
Average Burn Rate During Stove Operation 1.2 KG/Hour (dry)

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar) 413 Degrees F 212 Degrees C
Test Facility Ambient Temperature 80 Degrees F 27 Degrees C

Particulate Emissions

Emission Factor 15.0 G/Kg
Emission Rate 18.4 G/Hour
Concentration 908 Mg/M3

Breakdown of Particulate Sample

Rinse	32.6%
XAD-2	19.9%
Filter	47.5%
Total	100%

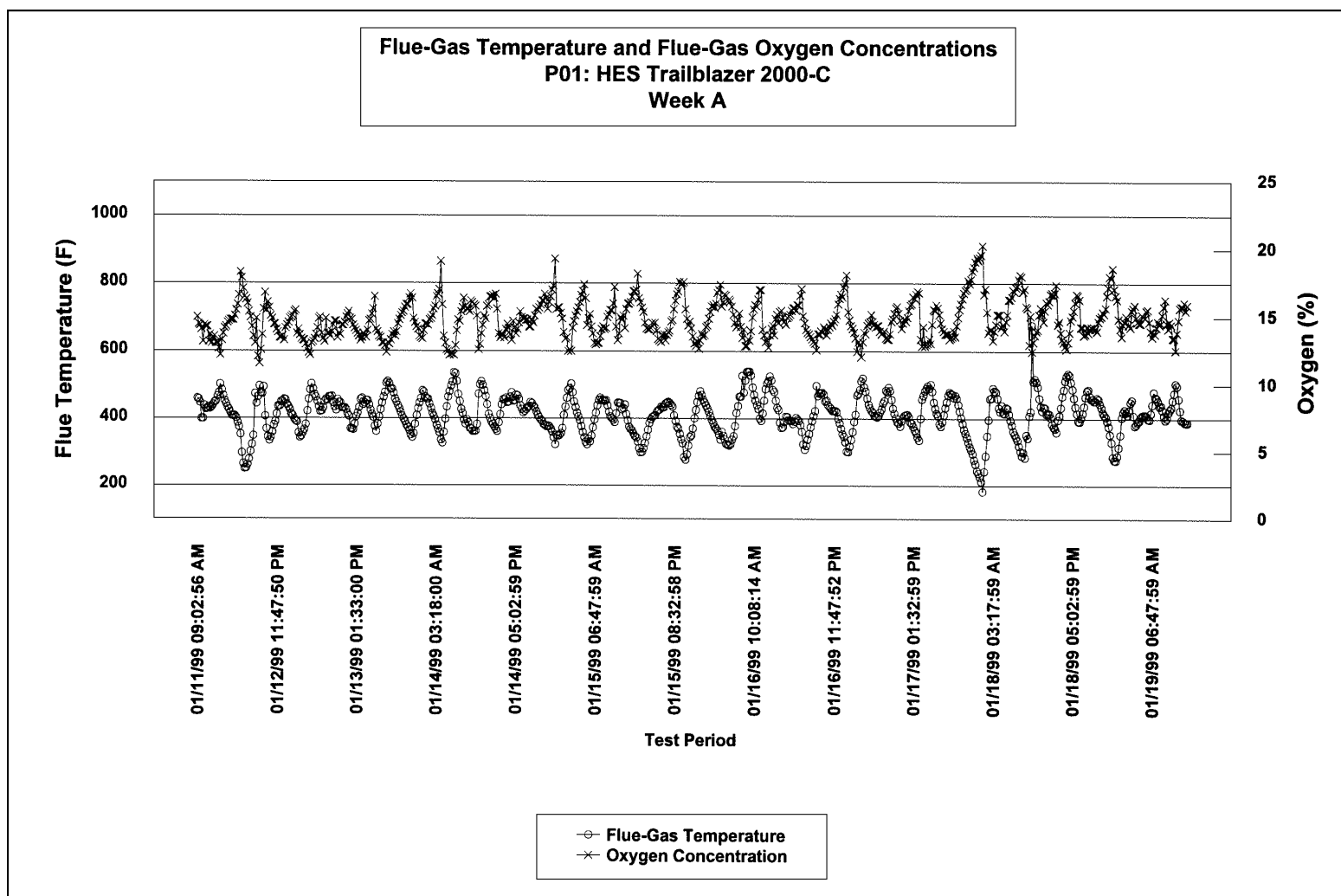
Average Flue-Gas Concentrations

Oxygen (AWES) 14.66 Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume For This Test is Based on 2.0% of Fuel Carbon Generating Carbon Monoxide and 98.0% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Portland, Oregon USA
Test Run Number: **Week B**
Test Period Start Date/Time: 01/19/99 01:32:01 PM
Test Period End Date/Time: 01/26/99 01:32:57 PM
Stove Model Tested: **P01: HES Trailblazer 2000-C**
Stove Type: Catalytic

Time

Total Test Period **168.25** Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F) **168.25** Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F) **100.0%**

ESS Settings

ESS Sampling Rate **1.058** L/Minute
Sample Cycle Duration **15.00** Minutes
Sample Time Per Sample Cycle **120** Seconds

Fuel

Total Fuel Used **252.9** KG With Moisture
Average Fuel Moisture **21.0%** Percent Dry Basis
Total Fuel Burned **209.0** KG Dry
Average Burn Rate During Stove Operation **1.2** KG/Hour (dry)

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar) **443** Degrees F **229** Degrees C
Test Facility Ambient Temperature **71** Degrees F **22** Degrees C

Particulate Emissions

Emission Factor **12.9** G/Kg
Emission Rate **16.0** G/Hour
Concentration **803** Mg/M3

Breakdown of Particulate Sample

Rinse	32.9%
XAD-2	22.8%
Filter	44.3%
Total	100%

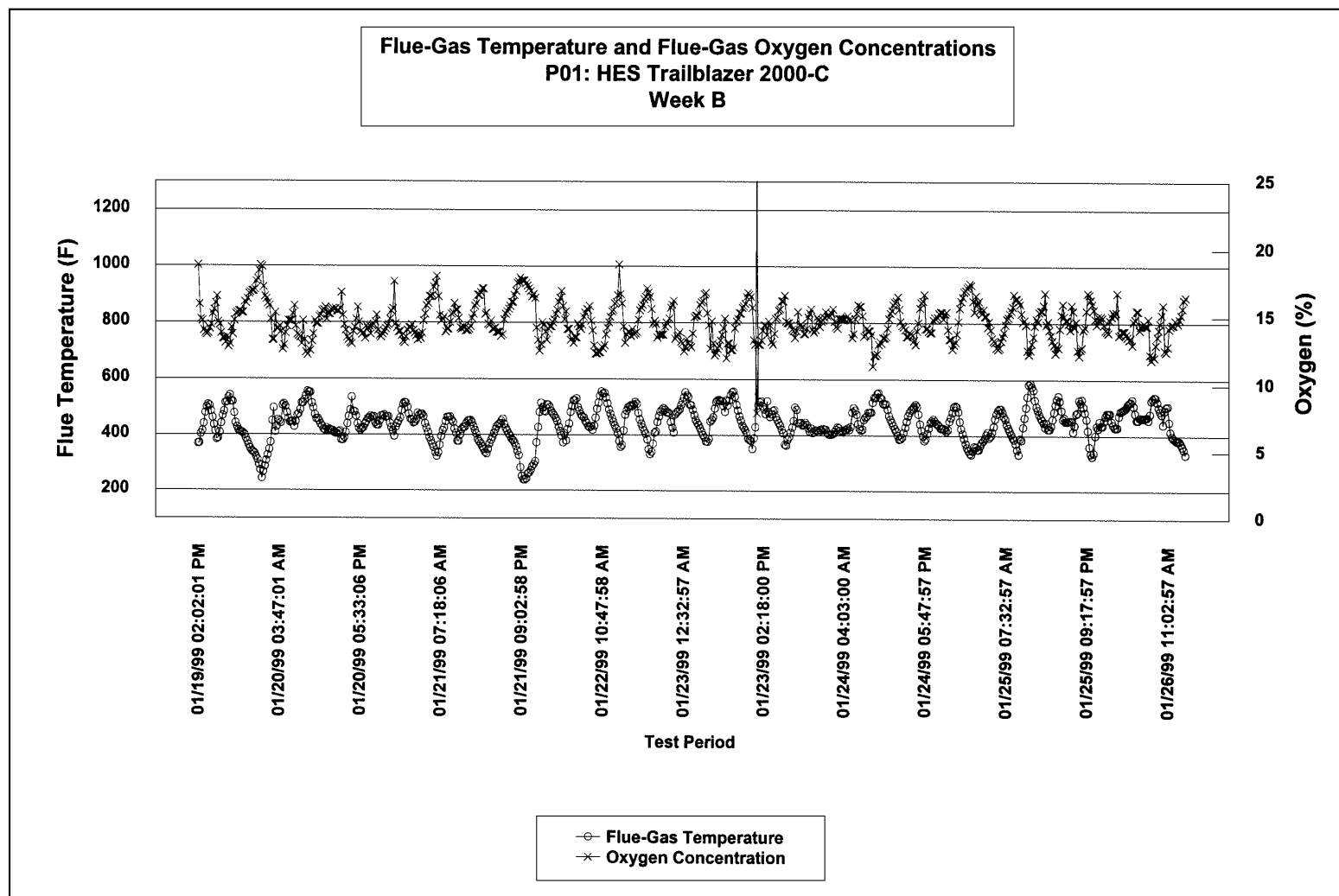
Average Flue-Gas Concentrations

Oxygen (AWES) **14.44** Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume For This Test is Based on 2.0% of Fuel Carbon Generating Carbon Monoxide and 98.0% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Portland, Oregon USA
Test Run Number: Week C
Test Period Start Date/Time: 01/26/99 02:47:01 PM
Test Period End Date/Time: 02/02/99 02:32:57 PM
Stove Model Tested: P01: HES Trailblazer 2000-C
Stove Type: Catalytic

Time

Total Test Period 168.00 Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F) 168 Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F) 100.0%

ESS Settings

ESS Sampling Rate 1.058 L/Minute
Sample Cycle Duration 15.00 Minutes
Sample Time Per Sample Cycle 120 Seconds

Fuel

Total Fuel Used 258.9 KG With Moisture
Average Fuel Moisture 22.8% Percent Dry Basis
Total Fuel Burned 210.9 KG Dry
Average Burn Rate During Stove Operation 1.3 KG/Hour (dry)

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar) 457 Degrees F 236 Degrees C
Test Facility Ambient Temperature 72 Degrees F 22 Degrees C

Particulate Emissions

Emission Factor 13.5 G/Kg
Emission Rate 16.9 G/Hour
Concentration 913 Mg/M3

Breakdown of Particulate Sample

Rinse	52.5%
XAD-2	17.8%
Filter	29.7%
Total	100%

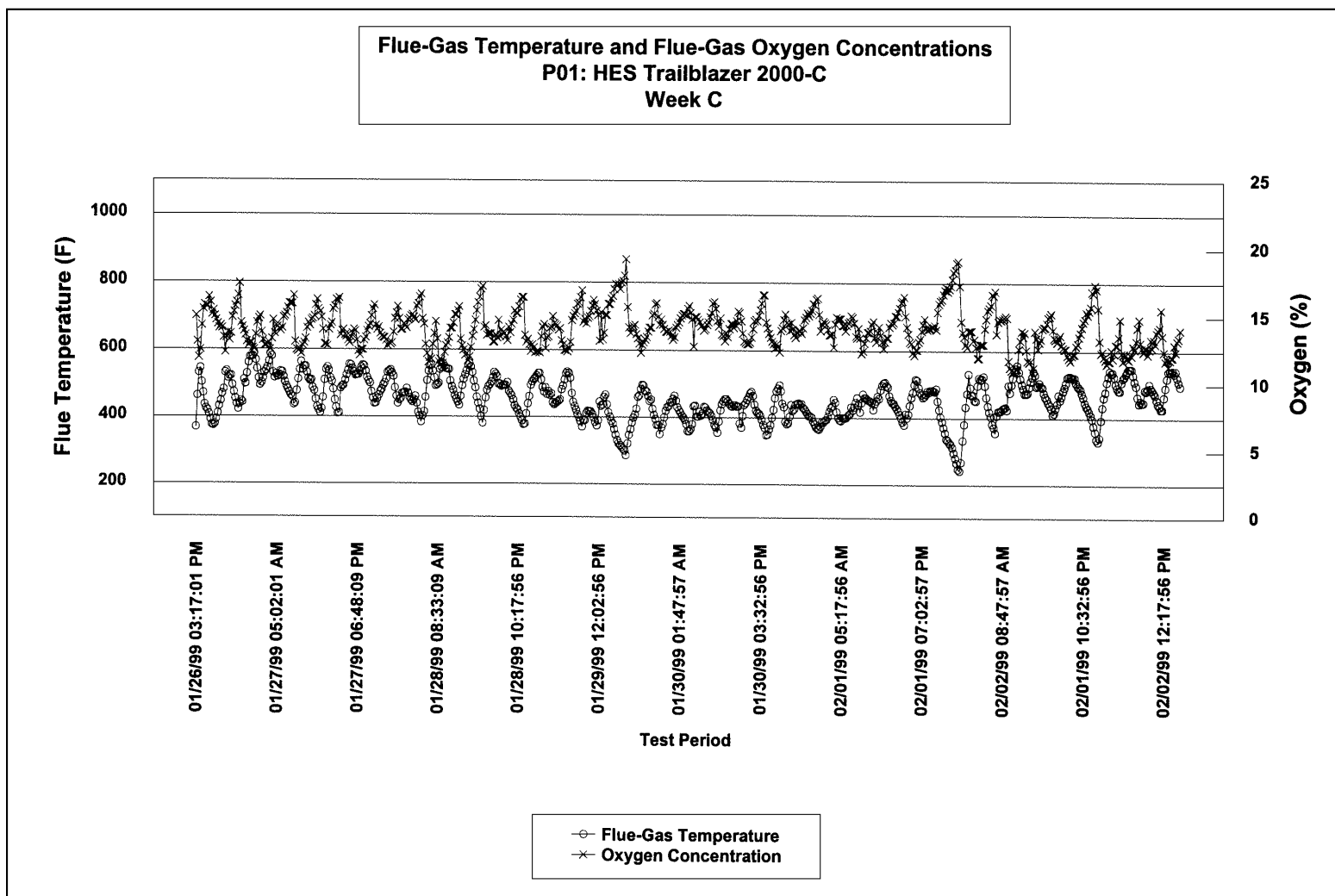
Average Flue-Gas Concentrations

Oxygen (AWES) 13.90 Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume For This Test is Based on 2.0% of Fuel Carbon Generating Carbon Monoxide and 98.0% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Portland, Oregon USA
Test Run Number: **Week A**
Test Period Start Date/Time: 01/13/99 02:02:45 PM
Test Period End Date/Time: 01/20/99 01:47:50 PM
Stove Model Tested: **P02: Lopi Answer Series**
Stove Type: New Tech/Non-Catalytic

Time

Total Test Period **168.00** Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F) **92.25** Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F) **54.9%**

ESS Settings

ESS Sampling Rate **1.124** L/Minute
Sample Cycle Duration **15.00** Minutes
Sample Time Per Sample Cycle **120** Seconds

Fuel

Total Fuel Used **117.6** KG With Moisture
Average Fuel Moisture **101.2%** Percent Dry Basis
Total Fuel Burned **58.5** KG Dry
Average Burn Rate During Stove Operation **0.6** KG/Hour (dry)

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar) **311** Degrees F **155** Degrees C
Test Facility Ambient Temperature **76** Degrees F **24** Degrees C

Particulate Emissions

Emission Factor **19.4** G/Kg
Emission Rate **12.3** G/Hour
Concentration **553** Mg/M3

Breakdown of Particulate Sample

Rinse	43.9%
XAD-2	16.4%
Filter	39.7%
Total	100%

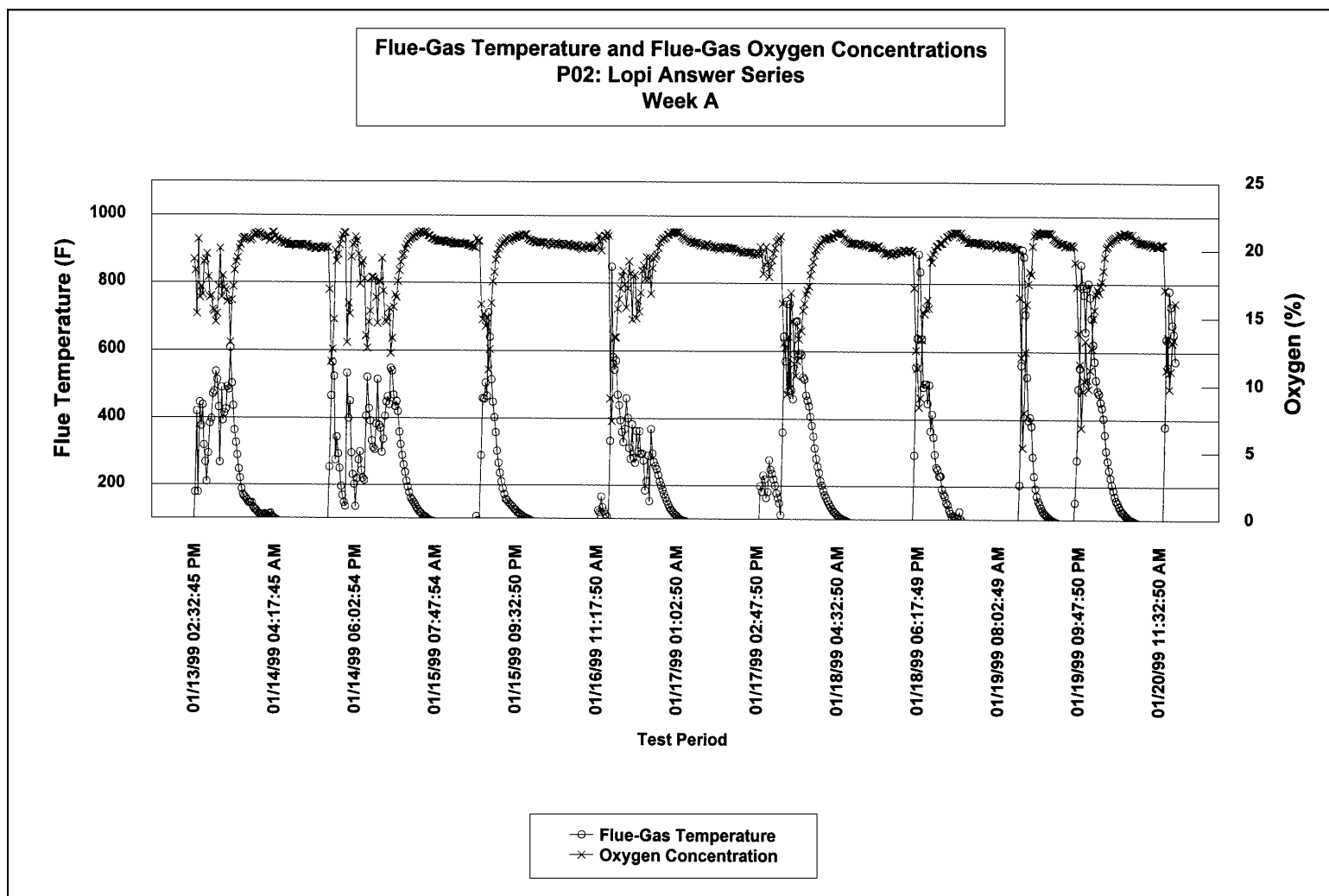
Average Flue-Gas Concentrations

Oxygen (AWES) **18.13** Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Portland, Oregon USA
Test Run Number: **Week B**
Test Period Start Date/Time: 01/20/99 02:48:21 PM
Test Period End Date/Time: 01/27/99 02:32:52 PM
Stove Model Tested: **P02: Lopi Answer Series**
Stove Type: New Tech/Non-Catalytic

Time

Total Test Period **166.75** Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F) **114.75** Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F) **68.8%**

ESS Settings

ESS Sampling Rate **1.124** L/Minute
Sample Cycle Duration **15.00** Minutes
Sample Time Per Sample Cycle **120** Seconds

Fuel

Total Fuel Used **103.3** KG With Moisture
Average Fuel Moisture **18.5%** Percent Dry Basis
Total Fuel Burned **87.2** KG Dry
Average Burn Rate During Stove Operation **0.8** KG/Hour (dry)

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar) **339** Degrees F **170** Degrees C
Test Facility Ambient Temperature **78** Degrees F **25** Degrees C

Particulate Emissions

Emission Factor **17.5** G/Kg
Emission Rate **13.3** G/Hour
Concentration **814** Mg/M3

Breakdown of Particulate Sample

Rinse	32.4%
XAD-2	27.7%
Filter	39.9%
Total	100%

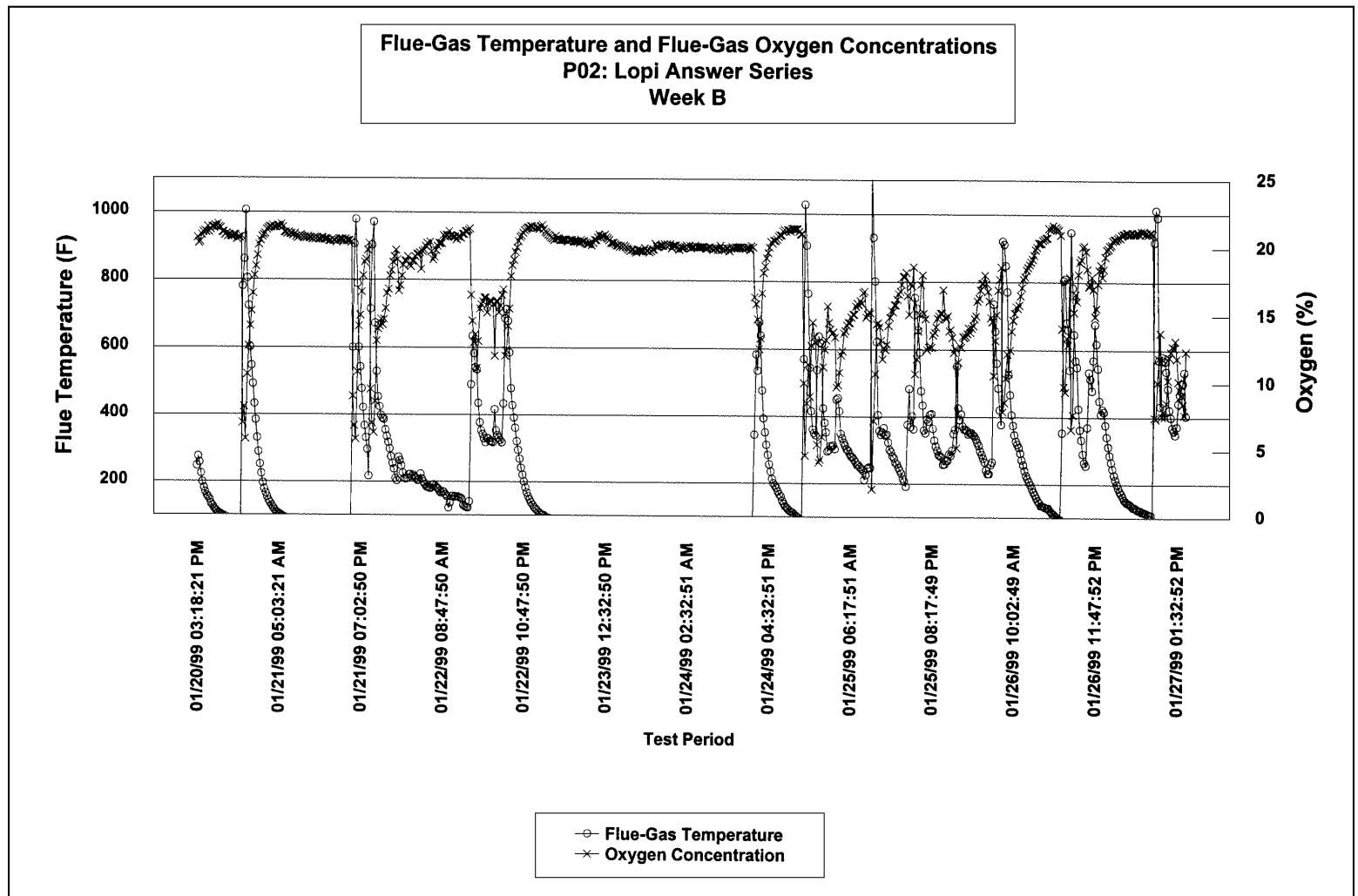
Average Flue-Gas Concentrations

Oxygen (AWES) **16.50** Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Portland, Oregon USA
Test Run Number: **Week C**
Test Period Start Date/Time: 01/27/99 03:47:00 PM
Test Period End Date/Time: 02/03/99 03:32:51 PM
Stove Model Tested: **P02: Lopi Answer Series**
Stove Type: New Tech/Non-Catalytic

Time

Total Test Period **168.00** Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F) **109.5** Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F) **65.2%**

ESS Settings

ESS Sampling Rate **1.124** L/Minute
Sample Cycle Duration **15.00** Minutes
Sample Time Per Sample Cycle **120** Seconds

Fuel

Total Fuel Used **99.9** KG With Moisture
Average Fuel Moisture **26.7%** Percent Dry Basis
Total Fuel Burned **78.9** KG Dry
Average Burn Rate During Stove Operation **0.7** KG/Hour (dry)

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar) **324** Degrees F **162** Degrees C
Test Facility Ambient Temperature **71** Degrees F **22** Degrees C

Particulate Emissions

Emission Factor **14.3** G/Kg
Emission Rate **10.3** G/Hour
Concentration **577** Mg/M3

Breakdown of Particulate Sample

Rinse	47.9%
XAD-2	16.9%
Filter	35.2%
Total	100%

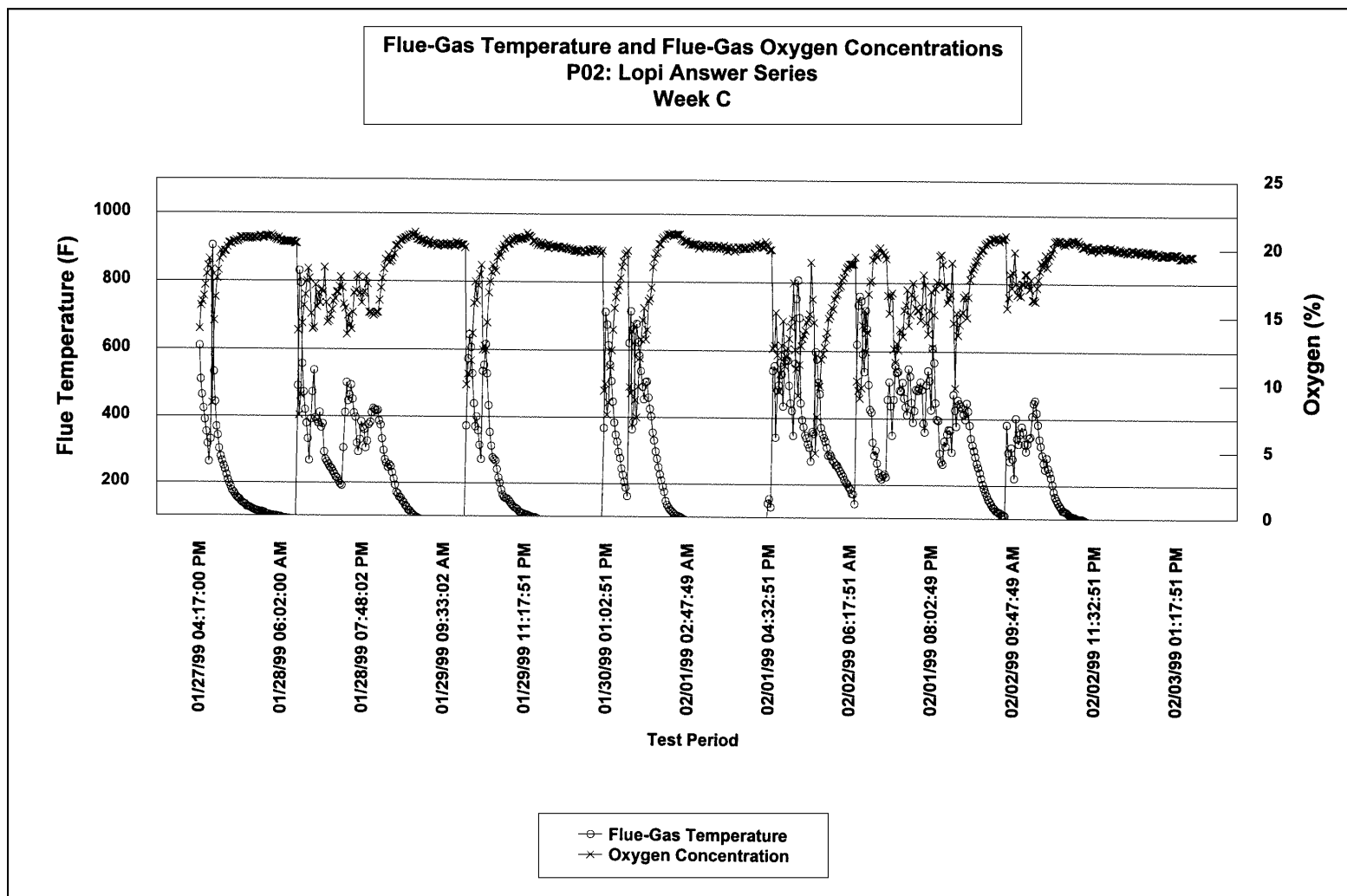
Average Flue-Gas Concentrations

Oxygen (AWES) **17.00** Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Portland, Oregon USA
Test Run Number: **Week A**
Test Period Start Date/Time: 01/12/99 09:17:01 AM
Test Period End Date/Time: 01/19/99 09:48:01 AM
Stove Model Tested: **P03: Lopi 380-96 Non-Catalytic**
Stove Type: New Tech/Non-Catalytic

Time

Total Test Period **168.75** Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F) **34** Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F) **20.1%**

ESS Settings

ESS Sampling Rate **1.069** L/Minute
Sample Cycle Duration **15.00** Minutes
Sample Time Per Sample Cycle **120** Seconds

Fuel

Total Fuel Used **32.5** KG With Moisture
Average Fuel Moisture **18.3%** Percent Dry Basis
Total Fuel Burned **27.5** KG Dry
Average Burn Rate During Stove Operation **0.8** KG/Hour (dry)

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar) **356** Degrees F **180** Degrees C
Test Facility Ambient Temperature **80** Degrees F **26** Degrees C

Particulate Emissions

Emission Factor **5.9** G/Kg
Emission Rate **4.7** G/Hour
Concentration **192** Mg/M3

Breakdown of Particulate Sample

Rinse	87.8%
XAD-2	21.1%
Filter	-9.0%
Total	100%

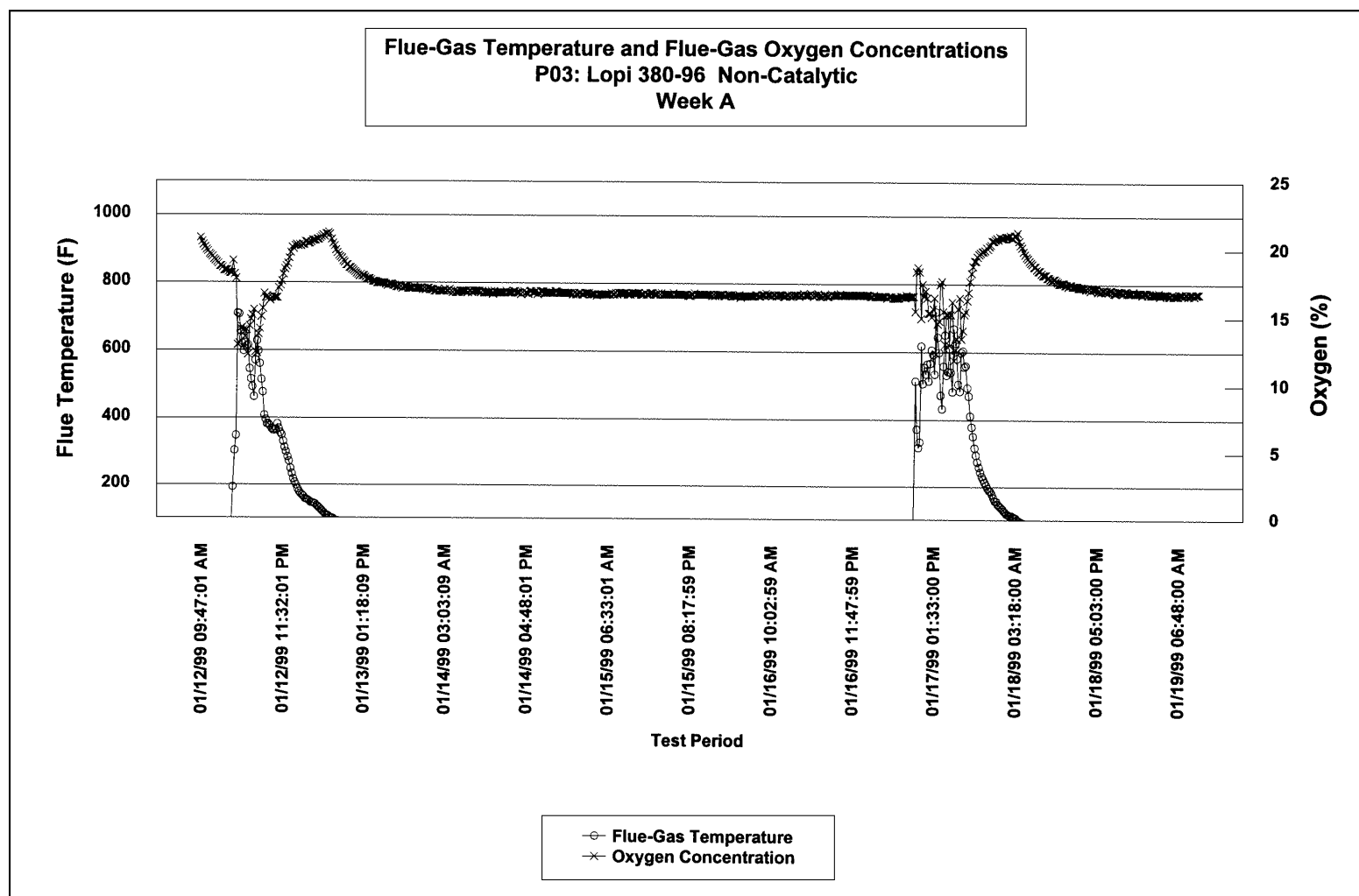
Average Flue-Gas Concentrations

Oxygen (AWES) **17.65** Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Portland, Oregon USA

Test Run Number: **Week B**

Test Period Start Date/Time: 01/19/99 11:17:10 AM

Test Period End Date/Time: 01/26/99 11:48:00 AM

Stove Model Tested: **P03: Lopi 380-96 Non-Catalytic**

Stove Type: New Tech/Non-Catalytic

Time

Total Test Period **168.75** Hours

Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F) **59.25** Hours

Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F) **35.1%**

ESS Settings

ESS Sampling Rate **1.069** L/Minute

Sample Cycle Duration **15.00** Minutes

Sample Time Per Sample Cycle **120** Seconds

Fuel

Total Fuel Used **72.8** KG With Moisture

Average Fuel Moisture **18.3%** Percent Dry Basis

Total Fuel Burned **61.5** KG Dry

Average Burn Rate During Stove Operation **1.0** KG/Hour (dry)

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar) **370** Degrees F **188** Degrees C

Test Facility Ambient Temperature **74** Degrees F **24** Degrees C

Particulate Emissions

Emission Factor **7.1** G/Kg

Emission Rate **7.4** G/Hour

Concentration **215** Mg/M3

Breakdown of Particulate Sample

Rinse **74.2%**

XAD-2 **13.4%**

Filter **12.4%**

Total **100%**

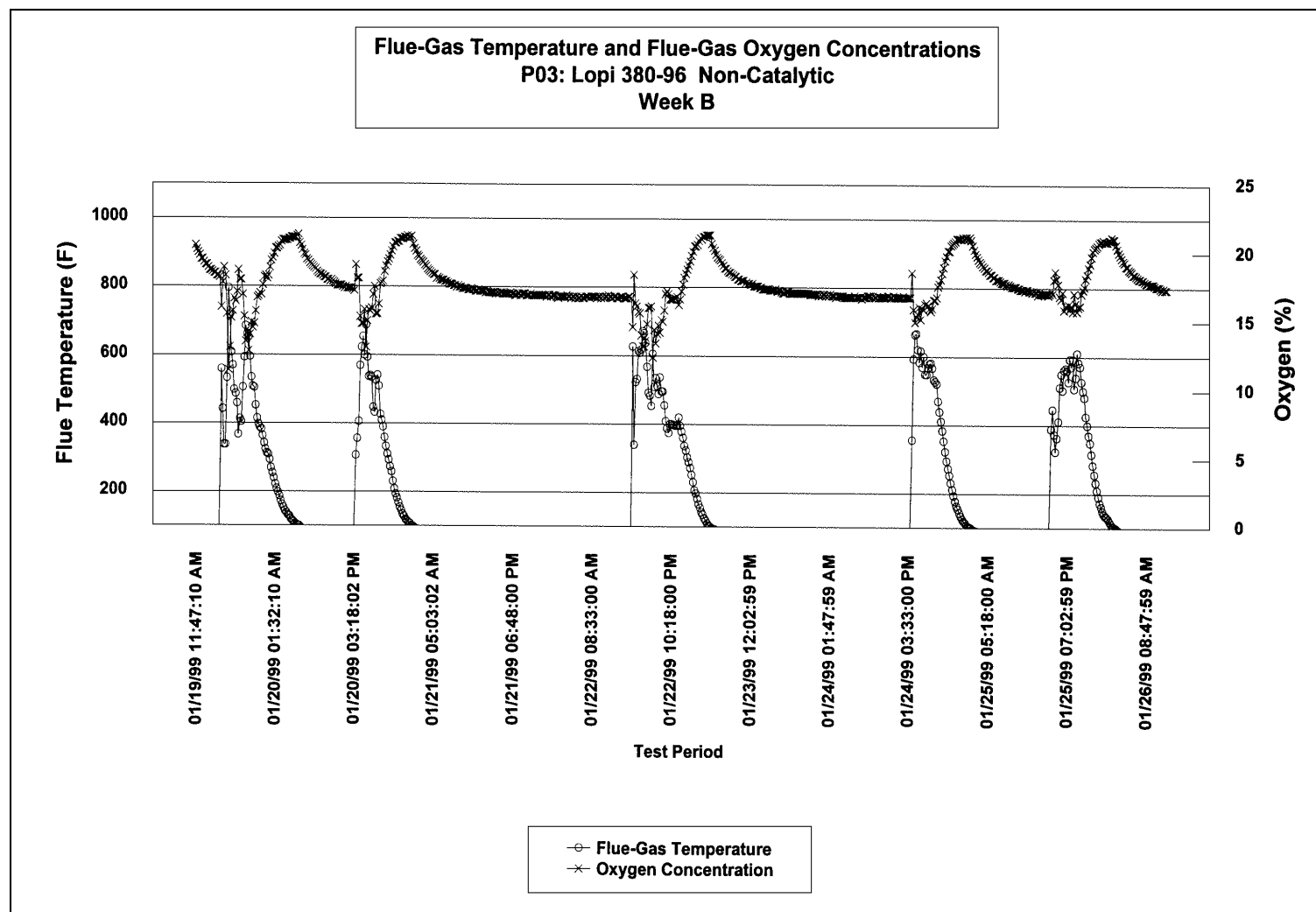
Average Flue-Gas Concentrations

Oxygen (AWES) **17.89** Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Portland, Oregon USA
Test Run Number: **Week C**
Test Period Start Date/Time: 01/26/99 12:32:01 PM
Test Period End Date/Time: 02/02/99 12:17:58 PM
Stove Model Tested: **P03: Lopi 380-96 Non-Catalytic**
Stove Type: New Tech/Non-Catalytic

Time

Total Test Period **168.00** Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F) **68.75** Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F) **40.9%**

ESS Settings

ESS Sampling Rate **1.069** L/Minute
Sample Cycle Duration **15.00** Minutes
Sample Time Per Sample Cycle **120** Seconds

Fuel

Total Fuel Used **85.4** KG With Moisture
Average Fuel Moisture **23.3%** Percent Dry Basis
Total Fuel Burned **69.2** KG Dry
Average Burn Rate During Stove Operation **1.0** KG/Hour (dry)

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar) **367** Degrees F **186** Degrees C
Test Facility Ambient Temperature **74** Degrees F **23** Degrees C

Particulate Emissions

Emission Factor **5.8** G/Kg
Emission Rate **5.8** G/Hour
Concentration **188** Mg/M3

Breakdown of Particulate Sample

Rinse	77.8%
XAD-2	21.0%
Filter	1.2%
Total	100%

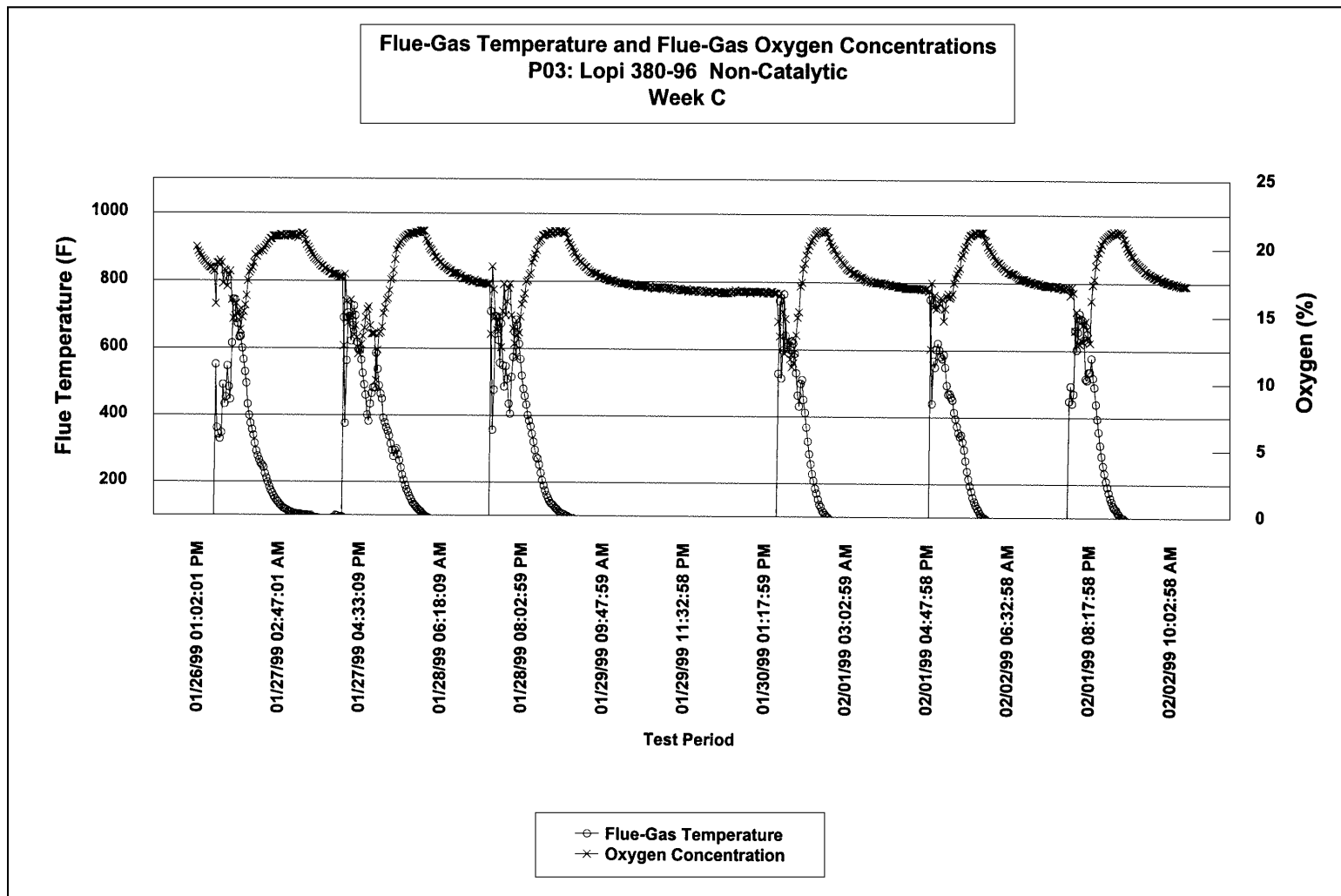
Average Flue-Gas Concentrations

Oxygen (AWES) **17.76** Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Portland, Oregon USA
Test Run Number: **Week A**
Test Period Start Date/Time: 01/13/99 11:02:01 AM
Test Period End Date/Time: 01/20/99 11:02:58 AM
Stove Model Tested: **P04: Lopi Flushbay-96 Catalytic**
Stove Type: Catalytic

Time

Total Test Period **168.25** Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F) **95.25** Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F) **56.6%**

ESS Settings

ESS Sampling Rate **1.145** L/Minute
Sample Cycle Duration **15.00** Minutes
Sample Time Per Sample Cycle **120** Seconds

Fuel

Total Fuel Used **83.6** KG With Moisture
Average Fuel Moisture **18.3%** Percent Dry Basis
Total Fuel Burned **70.7** KG Dry
Average Burn Rate During Stove Operation **0.7** KG/Hour (dry)

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar) **285** Degrees F **141** Degrees C
Test Facility Ambient Temperature **77** Degrees F **25** Degrees C

Particulate Emissions

Emission Factor **5.4** G/Kg
Emission Rate **4.0** G/Hour
Concentration **206** Mg/M3

Breakdown of Particulate Sample

Rinse	54.2%
XAD-2	19.2%
Filter	26.6%
Total	100%

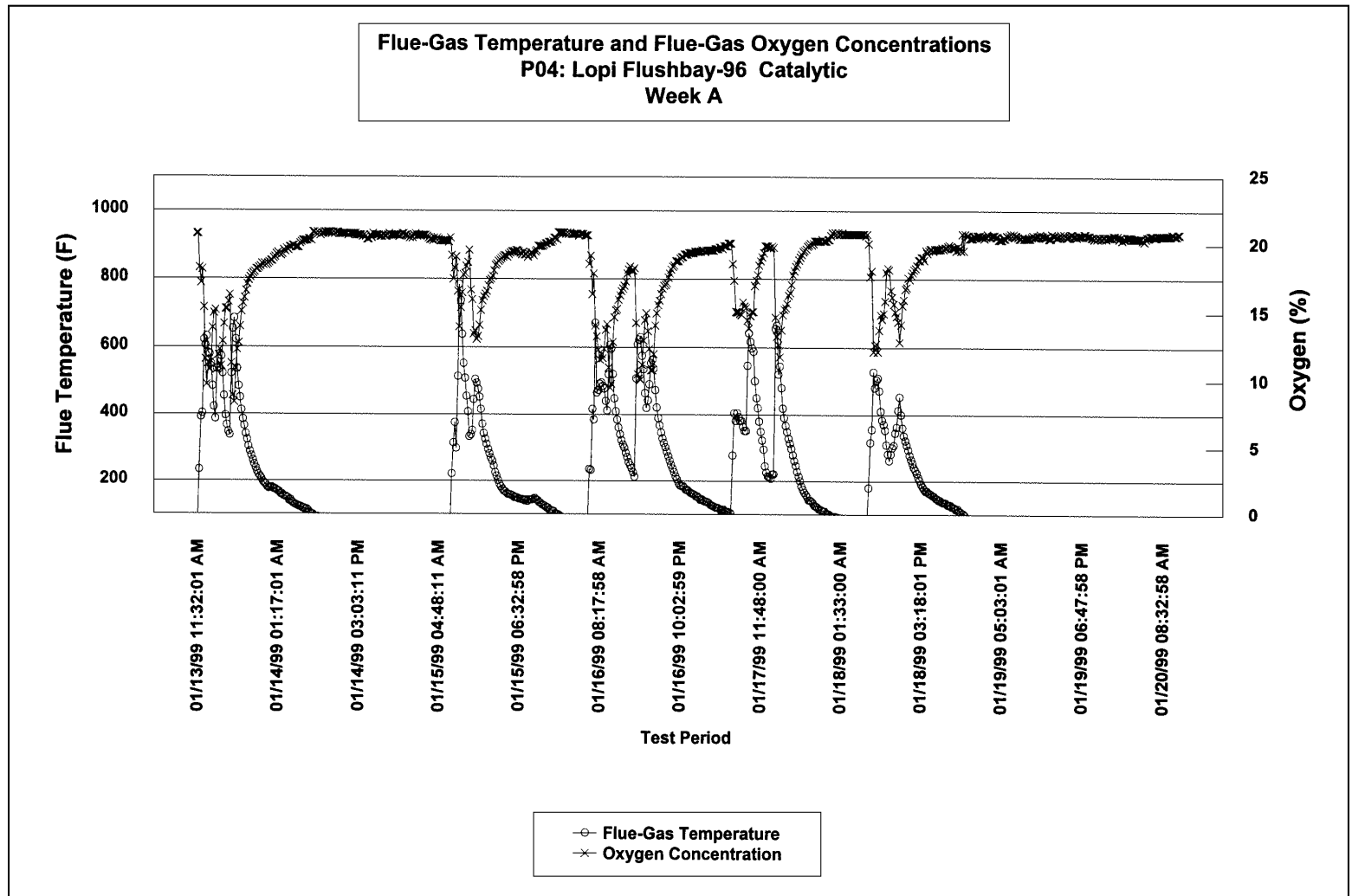
Average Flue-Gas Concentrations

Oxygen (AWES) **17.16** Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume For This Test is Based on 2.0% of Fuel Carbon Generating Carbon Monoxide and 98.0% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Portland, Oregon USA
Test Run Number: **Week B**
Test Period Start Date/Time: 01/20/99 01:17:00 PM
Test Period End Date/Time: 01/27/99 01:02:58 PM
Stove Model Tested: **P04: Lopi Flushbay-96 Catalytic**
Stove Type: Catalytic

Time

Total Test Period **168.00** Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F) **117** Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F) **69.6%**

ESS Settings

ESS Sampling Rate **1.145** L/Minute
Sample Cycle Duration **15.00** Minutes
Sample Time Per Sample Cycle **120** Seconds

Fuel

Total Fuel Used **130.0** KG With Moisture
Average Fuel Moisture **18.5%** Percent Dry Basis
Total Fuel Burned **109.7** KG Dry
Average Burn Rate During Stove Operation **0.9** KG/Hour (dry)

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar) **327** Degrees F **164** Degrees C
Test Facility Ambient Temperature **75** Degrees F **24** Degrees C

Particulate Emissions

Emission Factor **5.0** G/Kg
Emission Rate **4.7** G/Hour
Concentration **213** Mg/M3

Breakdown of Particulate Sample

Rinse	51.7%
XAD-2	17.2%
Filter	31.1%
Total	100%

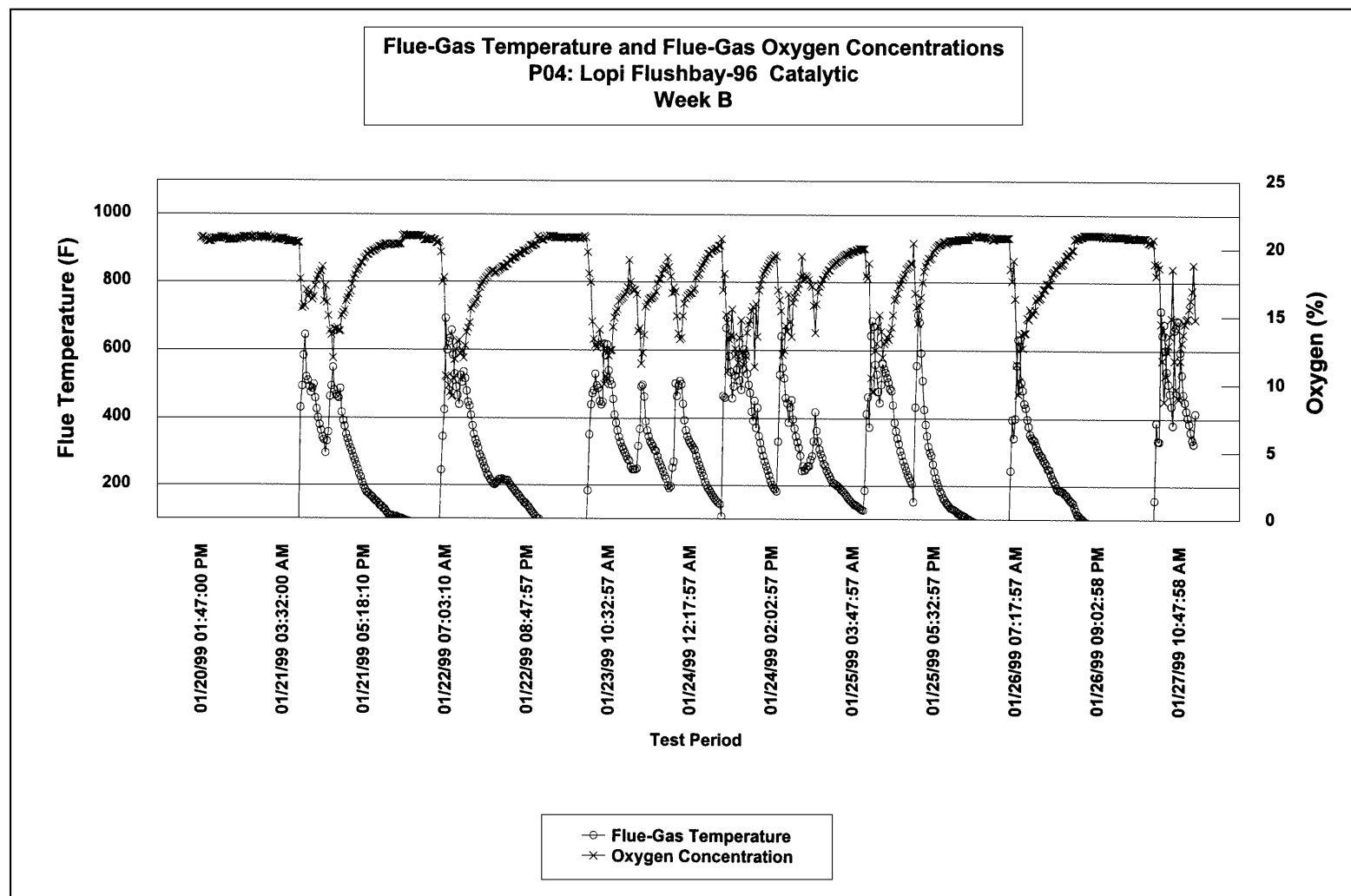
Average Flue-Gas Concentrations

Oxygen (AWES) **16.70** Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume For This Test is Based on 2.0% of Fuel Carbon Generating Carbon Monoxide and 98.0% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Portland, Oregon USA

Test Run Number: Week C

Test Period Start Date/Time: 01/27/99 02:32:00 PM

Test Period End Date/Time: 02/03/99 02:17:58 PM

Stove Model Tested: **P04: Lopi Flushbay-96 Catalytic**

Stove Type: Catalytic

Time

Total Test Period **168.00** Hours

Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F) **116.75** Hours

Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F) **69.5%**

ESS Settings

ESS Sampling Rate **1.145** L/Minute

Sample Cycle Duration **15.00** Minutes

Sample Time Per Sample Cycle **120** Seconds

Fuel

Total Fuel Used **91.1** KG With Moisture

Average Fuel Moisture **18.4%** Percent Dry Basis

Total Fuel Burned **77.0** KG Dry

Average Burn Rate During Stove Operation **0.7** KG/Hour (dry)

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar) **279** Degrees F **137** Degrees C

Test Facility Ambient Temperature **75** Degrees F **24** Degrees C

Particulate Emissions

Emission Factor **5.9** G/Kg

Emission Rate **3.9** G/Hour

Concentration **198** Mg/M3

Breakdown of Particulate Sample

Rinse **63.1%**

XAD-2 **12.9%**

Filter **23.9%**

Total 100%

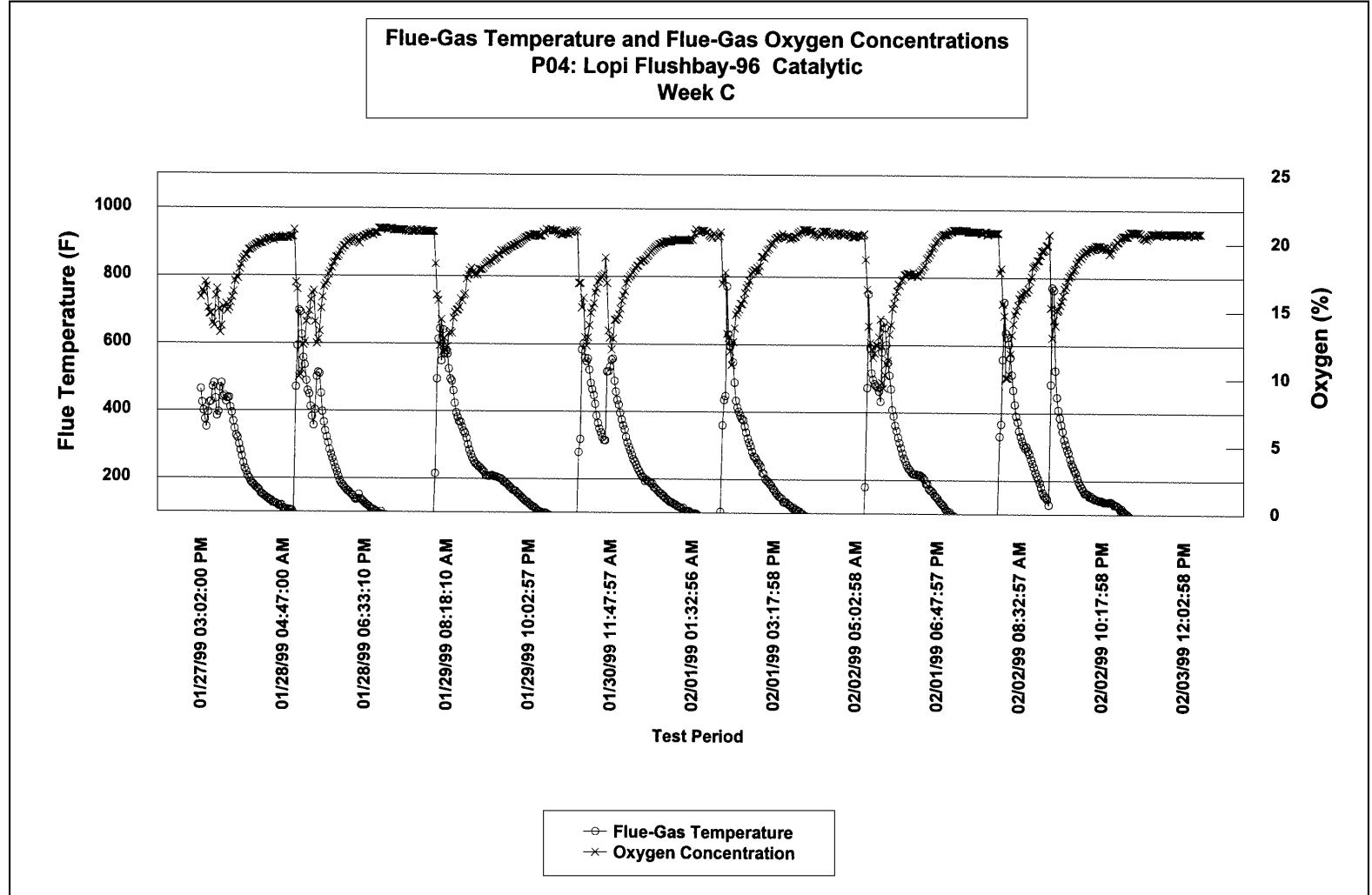
Average Flue-Gas Concentrations

Oxygen (AWES) **17.62** Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume For This Test is Based on 2.0% of Fuel Carbon Generating Carbon Monoxide and 98.0% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Portland, Oregon USA
Test Run Number: **Week A**
Test Period Start Date/Time: 01/14/99 09:33:02 AM
Test Period End Date/Time: 01/21/99 08:32:58 AM
Stove Model Tested: **P05: Lopi Flex-95 Catalytic**
Stove Type: Catalytic

Time

Total Test Period	167.25	Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F)	20	Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F)	12.0%	

ESS Settings

ESS Sampling Rate	1.038	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Fuel

Total Fuel Used	48.6	KG With Moisture
Average Fuel Moisture	19.3%	Percent Dry Basis
Total Fuel Burned	40.7	KG Dry
Average Burn Rate During Stove Operation	2.0	KG/Hour (dry)

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	334	Degrees F	168	Degrees C
Test Facility Ambient Temperature	73	Degrees F	23	Degrees C

Particulate Emissions

Emission Factor	7.0	G/Kg
Emission Rate	14.3	G/Hour
Concentration	169	Mg/M3

Breakdown of Particulate Sample

Rinse	133.8%
XAD-2	21.4%
Filter	-55.2%
Total	100%

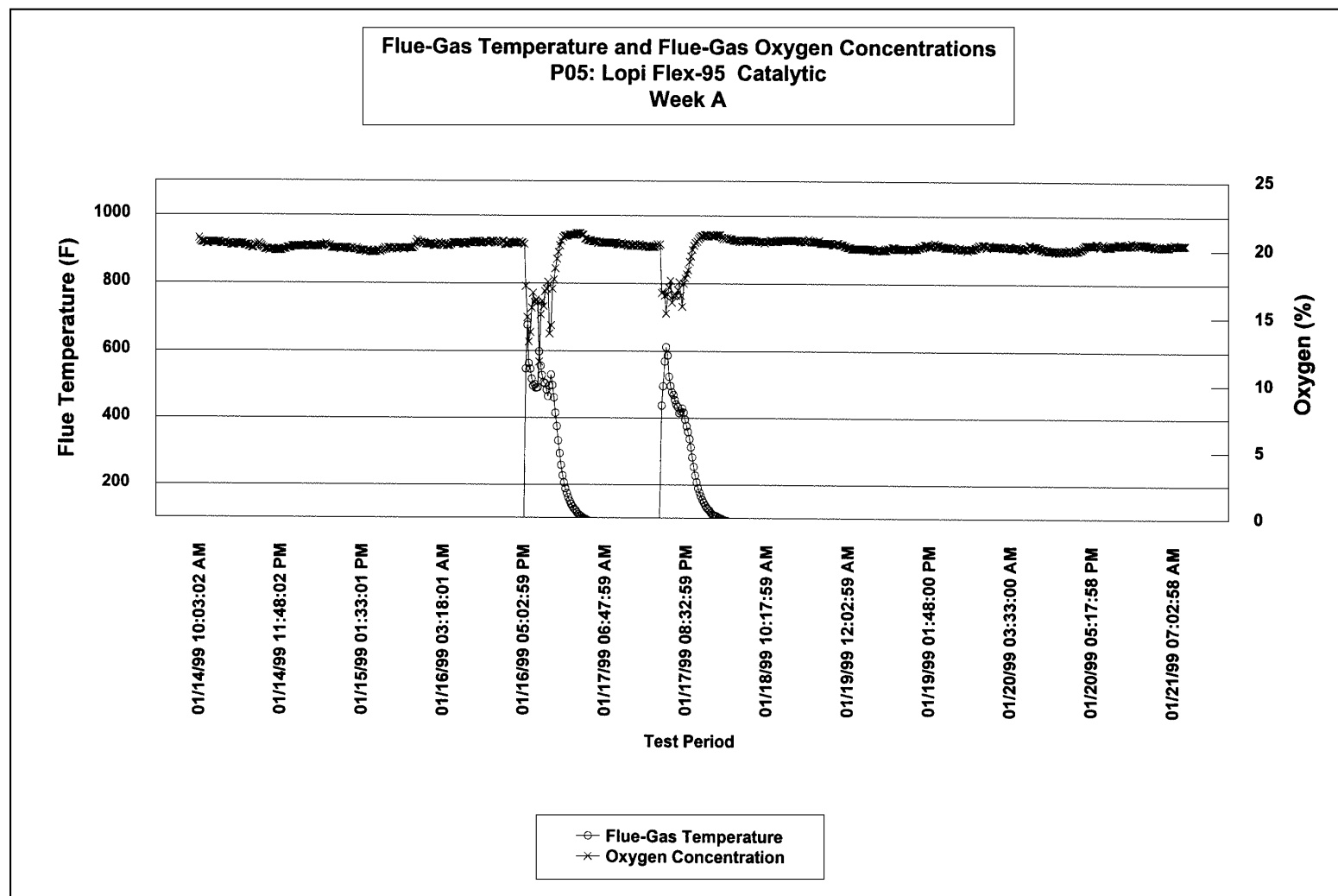
Average Flue-Gas Concentrations

Oxygen (AWES)	18.50	Percent
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Test Notes:

Test Note Number 1: Stoichiometric Volume For This Test is Based on 2.0% of Fuel Carbon Generating Carbon Monoxide and 98.0% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Portland, Oregon USA
Test Run Number: **Week B**
Test Period Start Date/Time: 01/22/99 03:32:02 PM
Test Period End Date/Time: 01/29/99 03:17:54 PM
Stove Model Tested: **P05: Lopi Flex-95 Catalytic**
Stove Type: Catalytic

Time

Total Test Period	168.00	Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F)	33.5	Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F)	19.9%	

ESS Settings

ESS Sampling Rate	1.038	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Fuel

Total Fuel Used	32.7	KG With Moisture
Average Fuel Moisture	19.0%	Percent Dry Basis
Total Fuel Burned	27.5	KG Dry
Average Burn Rate During Stove Operation	0.8	KG/Hour (dry)

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	403	Degrees F	206	Degrees C
Test Facility Ambient Temperature	72	Degrees F	22	Degrees C

Particulate Emissions

Emission Factor	6.4	G/Kg
Emission Rate	5.3	G/Hour
Concentration	180	Mg/M3

Breakdown of Particulate Sample

Rinse	103.6%
XAD-2	7.8%
Filter	-11.4%
Total	100%

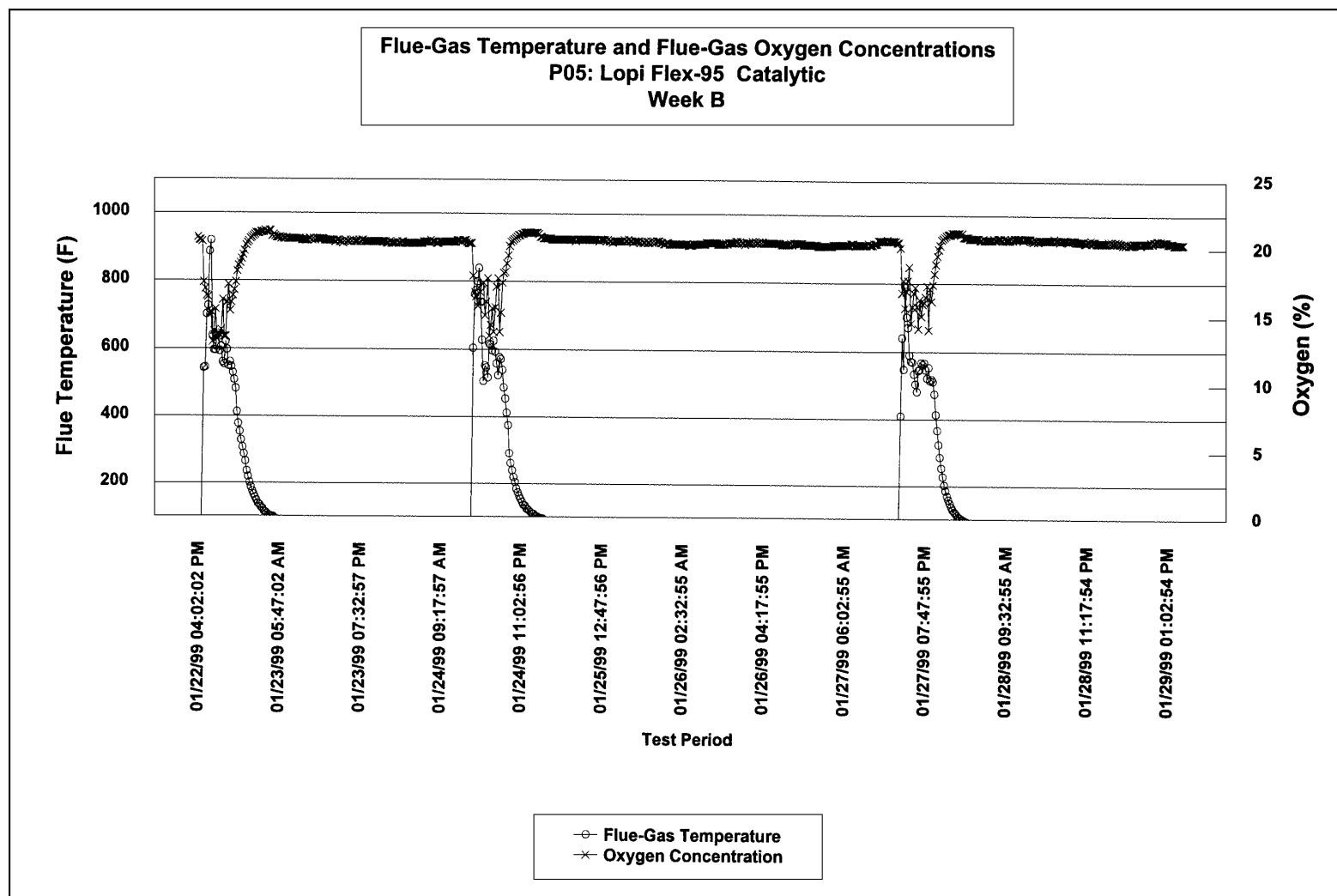
Average Flue-Gas Concentrations

Oxygen (AWES)	18.12	Percent
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Test Notes:

Test Note Number 1: Stoichiometric Volume For This Test is Based on 2.0% of Fuel Carbon Generating Carbon Monoxide and 98.0% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Portland, Oregon USA
Test Run Number: **Week C**
Test Period Start Date/Time: 01/30/99 11:02:01 AM
Test Period End Date/Time: 02/06/99 10:48:00 AM
Stove Model Tested: **P05: Lopi Flex-95 Catalytic**
Stove Type: Catalytic

Time

Total Test Period **168.00** Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F) **33.75** Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F) **20.1%**

ESS Settings

ESS Sampling Rate **1.038** L/Minute
Sample Cycle Duration **15.00** Minutes
Sample Time Per Sample Cycle **120** Seconds

Fuel

Total Fuel Used **38.1** KG With Moisture
Average Fuel Moisture **19.0%** Percent Dry Basis
Total Fuel Burned **32.0** KG Dry
Average Burn Rate During Stove Operation **0.9** KG/Hour (dry)

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar) **372** Degrees F **189** Degrees C
Test Facility Ambient Temperature **70** Degrees F **21** Degrees C

Particulate Emissions

Emission Factor **4.4** G/Kg
Emission Rate **4.2** G/Hour
Concentration **114** Mg/M3

Breakdown of Particulate Sample

Rinse	60.0%
XAD-2	20.0%
Filter	20.0%
Total	100%

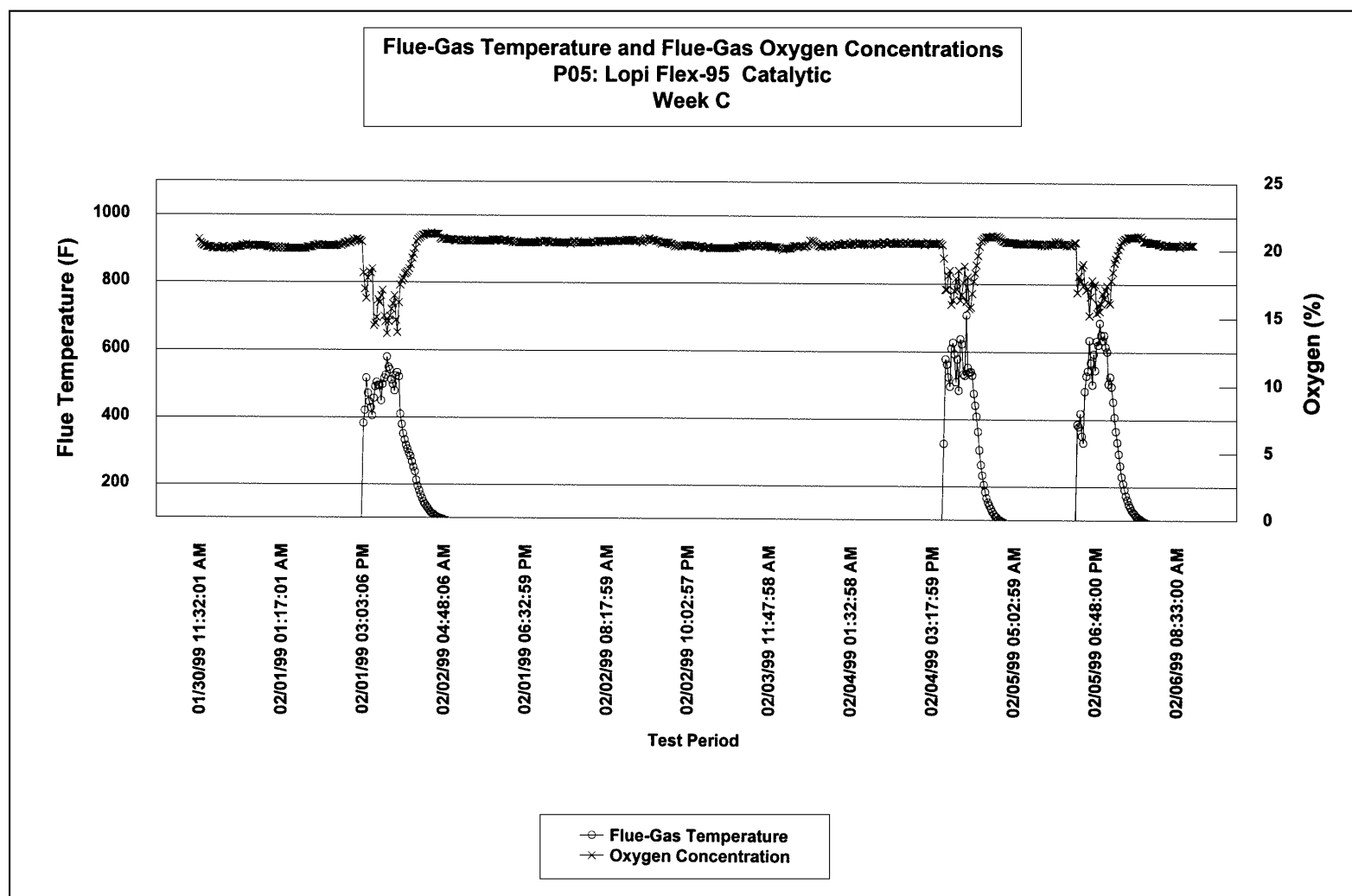
Average Flue-Gas Concentrations

Oxygen (AWES) **18.32** Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume For This Test is Based on 2.0% of Fuel Carbon Generating Carbon Monoxide and 98.0% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Portland, Oregon USA
Test Run Number: **Week A**
Test Period Start Date/Time: 01/23/99 10:47:01 AM
Test Period End Date/Time: 01/30/99 10:32:59 AM
Stove Model Tested: **P06: Pacific Energy Super-27 Non-Catalytic**
Stove Type: New Tech/Non-Catalytic

Time

Total Test Period **168.00** Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F) **139** Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F) **82.7%**

ESS Settings

ESS Sampling Rate **1.042** L/Minute
Sample Cycle Duration **15.00** Minutes
Sample Time Per Sample Cycle **120** Seconds

Fuel

Total Fuel Used **412.5** KG With Moisture
Average Fuel Moisture **100.8%** Percent Dry Basis
Total Fuel Burned **205.4** KG Dry
Average Burn Rate During Stove Operation **1.5** KG/Hour (dry)

Average Flue-Gas Concentrations

Oxygen (AWES) **15.52** Percent

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar) **475** Degrees F **246** Degrees C
Test Facility Ambient Temperature **71** Degrees F **22** Degrees C

Particulate Emissions

Emission Factor **9.1** G/Kg
Emission Rate **13.5** G/Hour
Concentration **508** Mg/M3

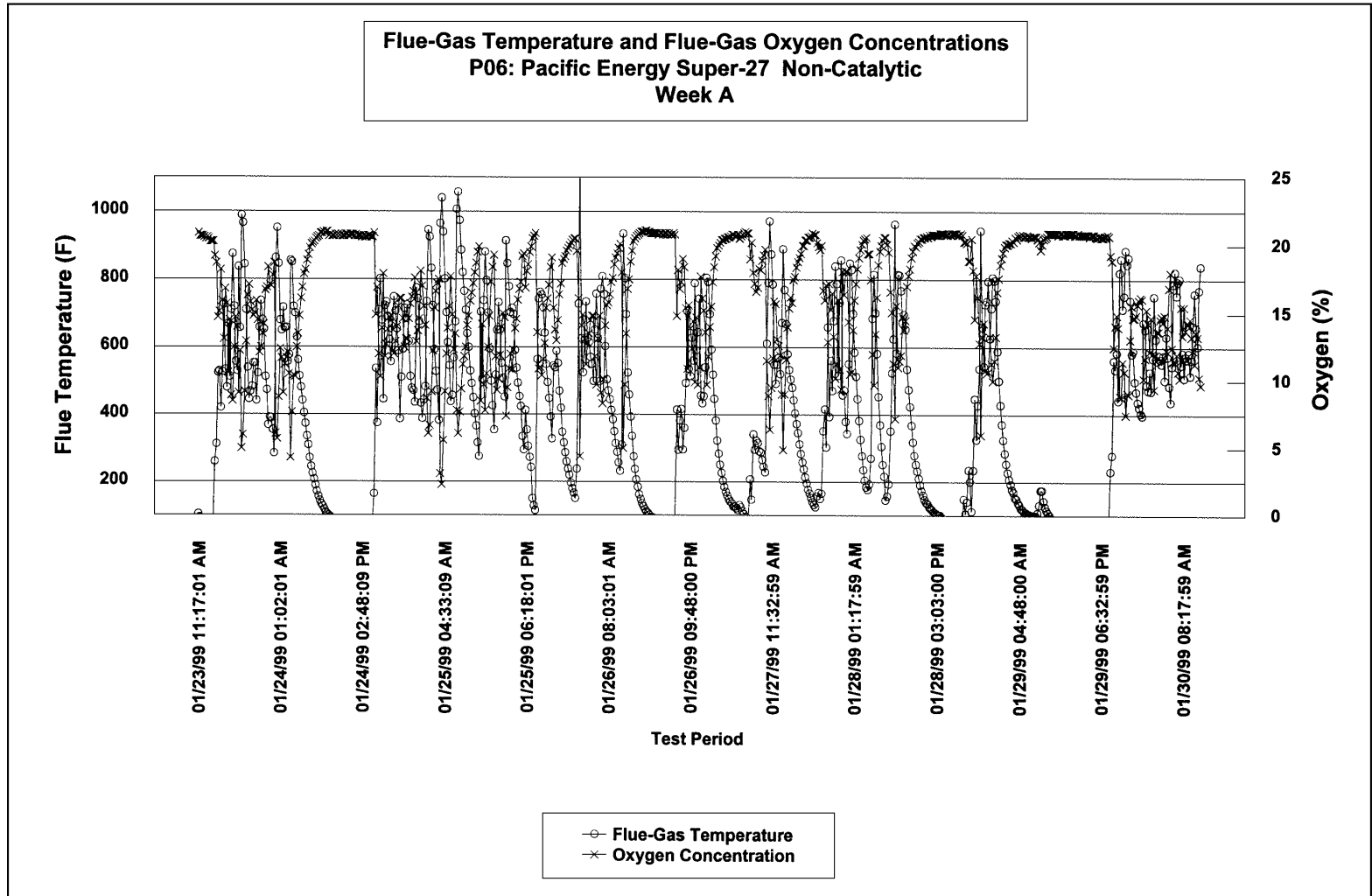
Breakdown of Particulate Sample

Rinse	39.6%
XAD-2	11.7%
Filter	48.6%
Total	100%

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Portland, Oregon USA
Test Run Number: **Week B**
Test Period Start Date/Time: 01/30/99 04:17:00 PM
Test Period End Date/Time: 02/06/99 04:02:57 PM
Stove Model Tested: **P06: Pacific Energy Super-27 Non-Catalytic**
Stove Type: New Tech/Non-Catalytic

Time

Total Test Period 168.00 Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F) 142 Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F) 84.5%

ESS Settings

ESS Sampling Rate 1.042 L/Minute
Sample Cycle Duration 15.00 Minutes
Sample Time Per Sample Cycle 120 Seconds

Fuel

Total Fuel Used 373.1 KG With Moisture
Average Fuel Moisture 105.0% Percent Dry Basis
Total Fuel Burned 182.0 KG Dry
Average Burn Rate During Stove Operation 1.3 KG/Hour (dry)

Average Flue-Gas Concentrations

Oxygen (AWES) 15.55 Percent

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar) 464 Degrees F 240 Degrees C
Test Facility Ambient Temperature 69 Degrees F 21 Degrees C

Particulate Emissions

Emission Factor 14.7 G/Kg
Emission Rate 18.9 G/Hour
Concentration 813 Mg/M3

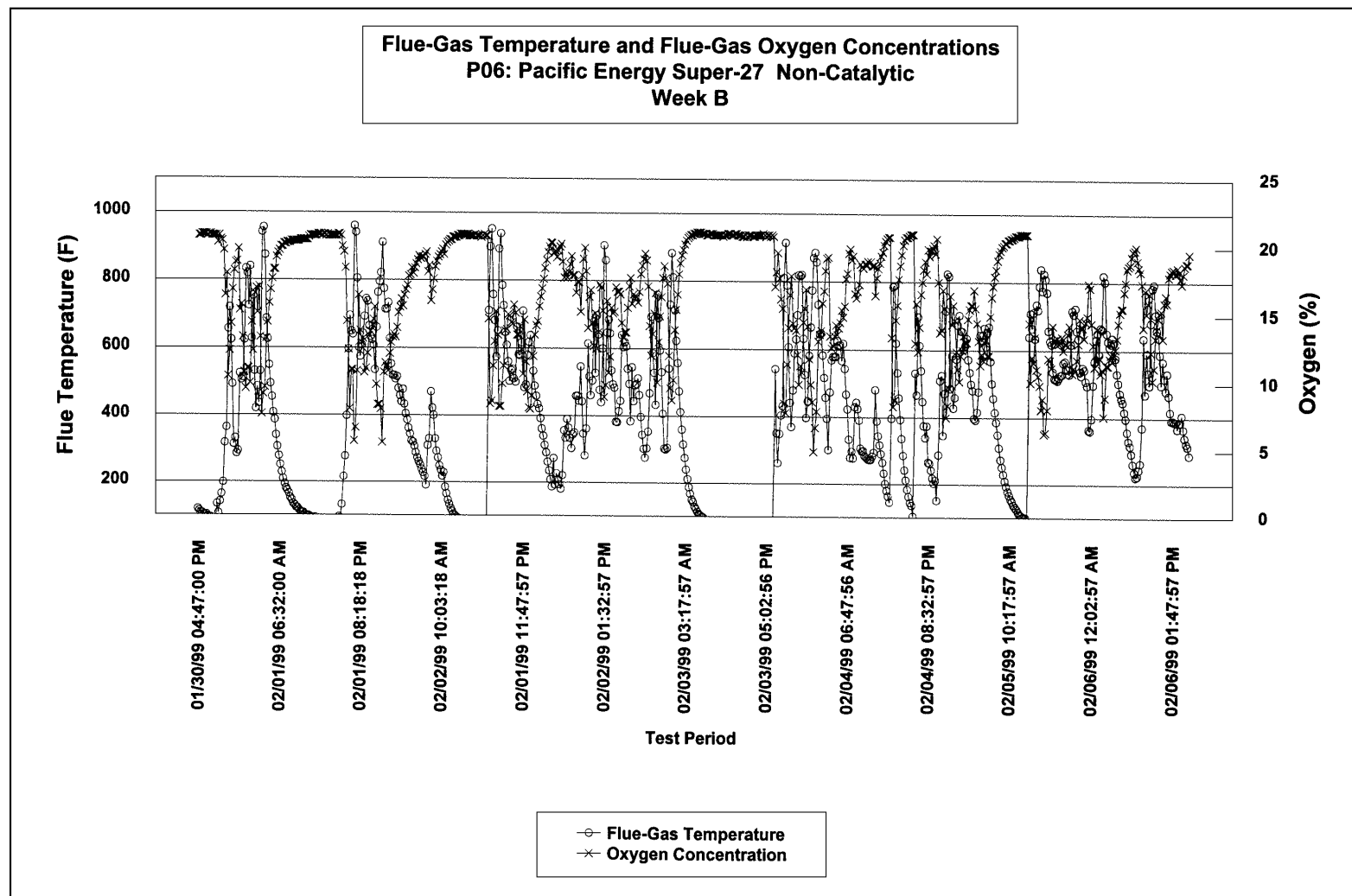
Breakdown of Particulate Sample

Rinse	29.5%
XAD-2	36.9%
Filter	33.5%
Total	100%

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Portland, Oregon USA

Test Run Number: **Week C**

Test Period Start Date/Time: 02/07/99 12:47:00 PM

Test Period End Date/Time: 02/14/99 11:17:58 AM

Stove Model Tested: **P06: Pacific Energy Super-27 Non-Catalytic**

Stove Type: New Tech/Non-Catalytic

Time

Total Test Period **166.75** Hours

Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F) **152.75** Hours

Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F) **91.6%**

ESS Settings

ESS Sampling Rate **1.042** L/Minute

Sample Cycle Duration **15.00** Minutes

Sample Time Per Sample Cycle **120** Seconds

Fuel

Total Fuel Used **351.7** KG With Moisture

Average Fuel Moisture **101.2%** Percent Dry Basis

Total Fuel Burned **174.9** KG Dry

Average Burn Rate During Stove Operation **1.1** KG/Hour (dry)

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar) **485** Degrees F **252** Degrees C

Test Facility Ambient Temperature **72** Degrees F **22** Degrees C

Particulate Emissions

Emission Factor **8.7** G/Kg

Emission Rate **10.0** G/Hour

Concentration **616** Mg/M3

Breakdown of Particulate Sample

Rinse **39.9%**

XAD-2 **13.9%**

Filter **46.2%**

Total **100%**

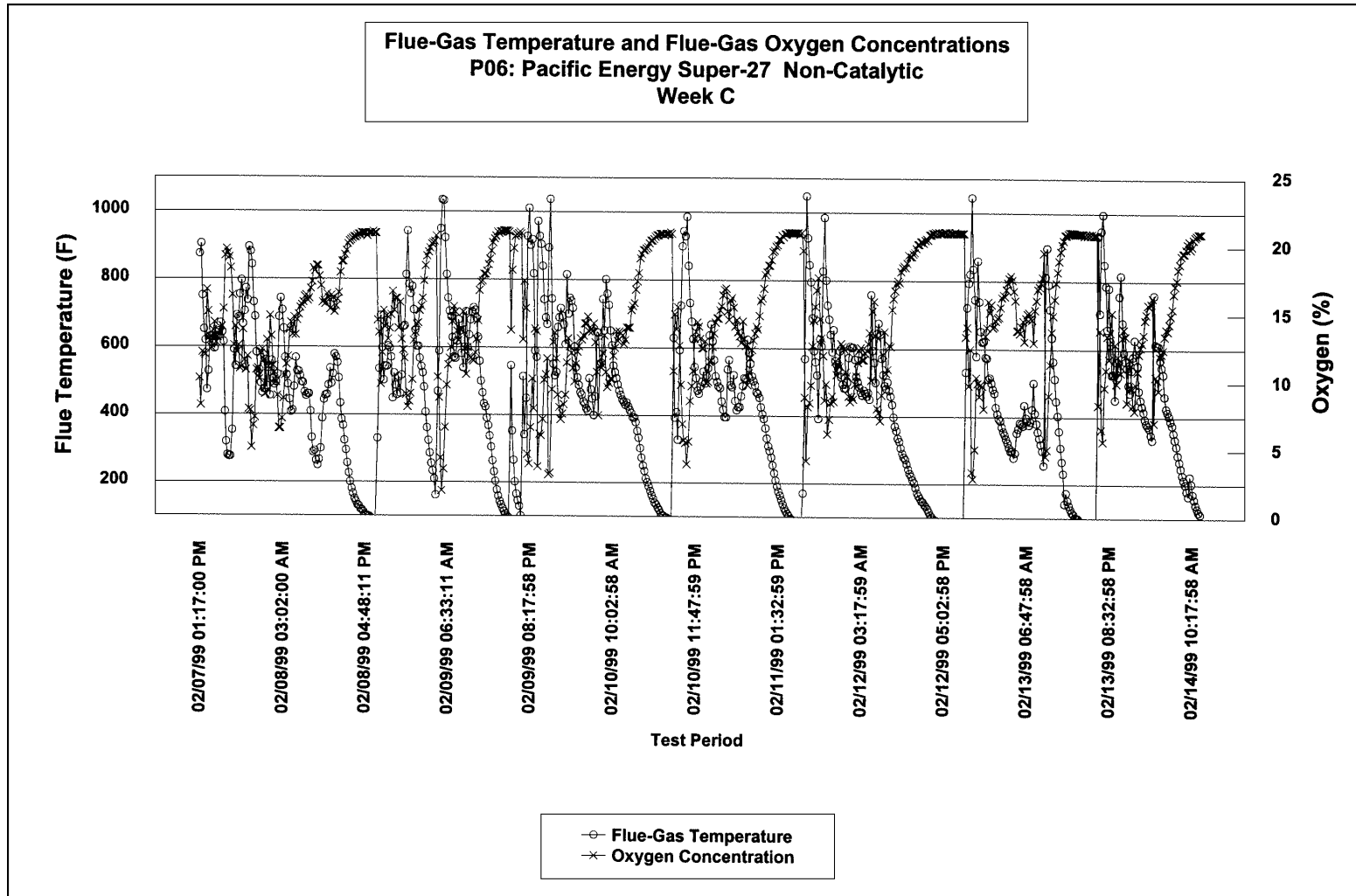
Average Flue-Gas Concentrations

Oxygen (AWES) **14.07** Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Portland, Oregon USA
Test Run Number: **Week A**
Test Period Start Date/Time: 01/20/99 09:17:00 AM
Test Period End Date/Time: 01/27/99 09:02:58 AM
Stove Model Tested: **P07: Lopi 520/96 Non-Catalytic**
Stove Type: New Tech/Non-Catalytic

Time

Total Test Period **168.00** Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F) **168** Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F) **100.0%**

ESS Settings

ESS Sampling Rate **1.109** L/Minute
Sample Cycle Duration **15.00** Minutes
Sample Time Per Sample Cycle **120** Seconds

Fuel

Total Fuel Used **487.2** KG With Moisture
Average Fuel Moisture **101.2%** Percent Dry Basis
Total Fuel Burned **242.2** KG Dry
Average Burn Rate During Stove Operation **1.4** KG/Hour (dry)

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar) **348** Degrees F **176** Degrees C
Test Facility Ambient Temperature **69** Degrees F **21** Degrees C

Particulate Emissions

Emission Factor **18.4** G/Kg
Emission Rate **26.6** G/Hour
Concentration **1097** Mg/M3

Breakdown of Particulate Sample

Rinse	20.4%
XAD-2	20.0%
Filter	59.6%
Total	100%

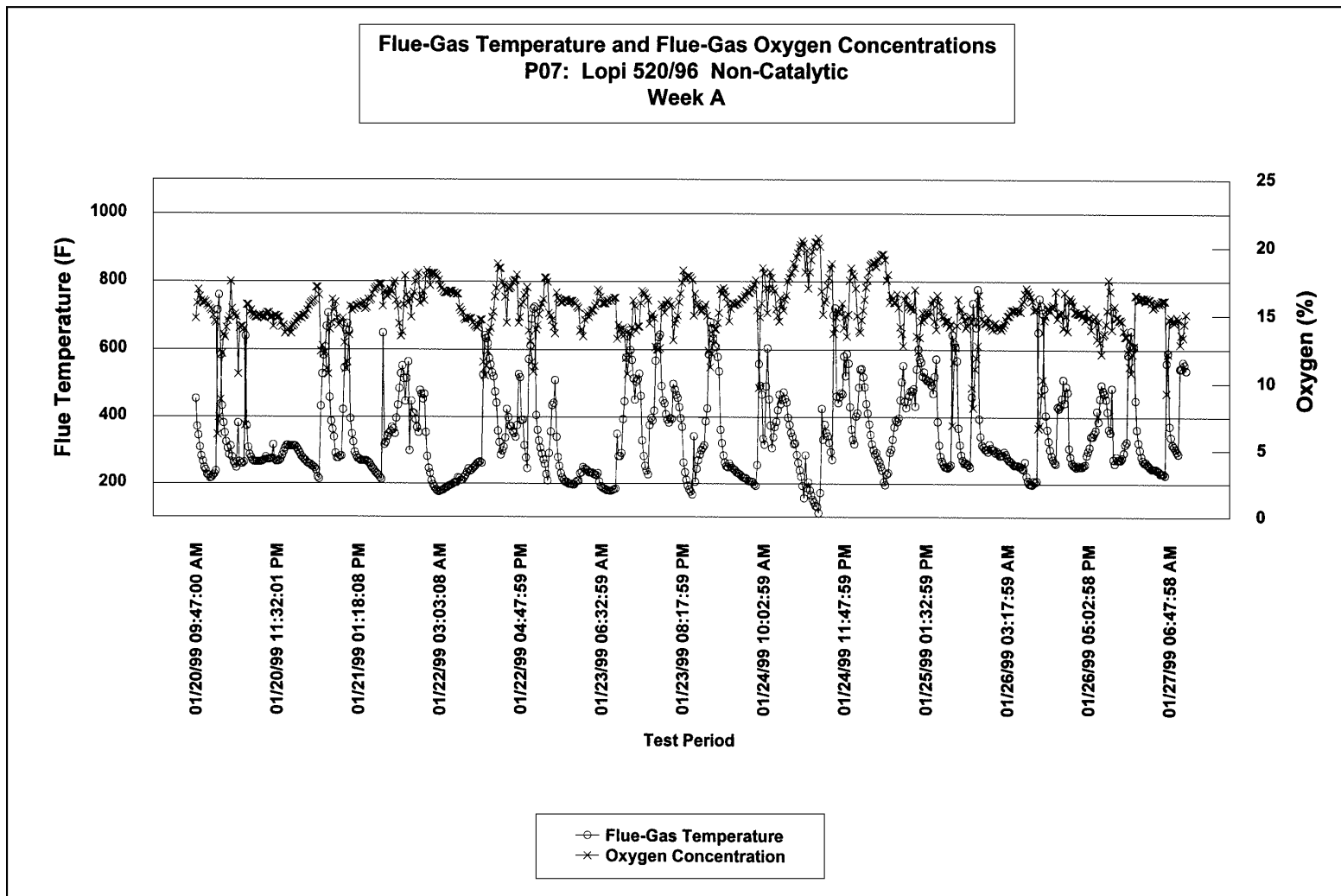
Average Flue-Gas Concentrations

Oxygen (AWES) **15.14** Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Portland, Oregon USA

Test Run Number: **Week B**

Test Period Start Date/Time: 01/27/99 11:32:01 AM

Test Period End Date/Time: 02/03/99 11:17:59 AM

Stove Model Tested: **P07: Lopi 520/96 Non-Catalytic**

Stove Type: New Tech/Non-Catalytic

Time

Total Test Period **168.00** Hours

Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F) **168** Hours

Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F) **100.0%**

ESS Settings

ESS Sampling Rate **1.109** L/Minute

Sample Cycle Duration **15.00** Minutes

Sample Time Per Sample Cycle **120** Seconds

Fuel

Total Fuel Used **517.4** KG With Moisture

Average Fuel Moisture **105.0%** Percent Dry Basis

Total Fuel Burned **252.4** KG Dry

Average Burn Rate During Stove Operation **1.5** KG/Hour (dry)

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar) **327** Degrees F **164** Degrees C

Test Facility Ambient Temperature **69** Degrees F **21** Degrees C

Particulate Emissions

Emission Factor **18.5** G/Kg

Emission Rate **27.7** G/Hour

Concentration **1099** Mg/M3

Breakdown of Particulate Sample

Rinse **24.9%**

XAD-2 **19.1%**

Filter **56.0%**

Total **100%**

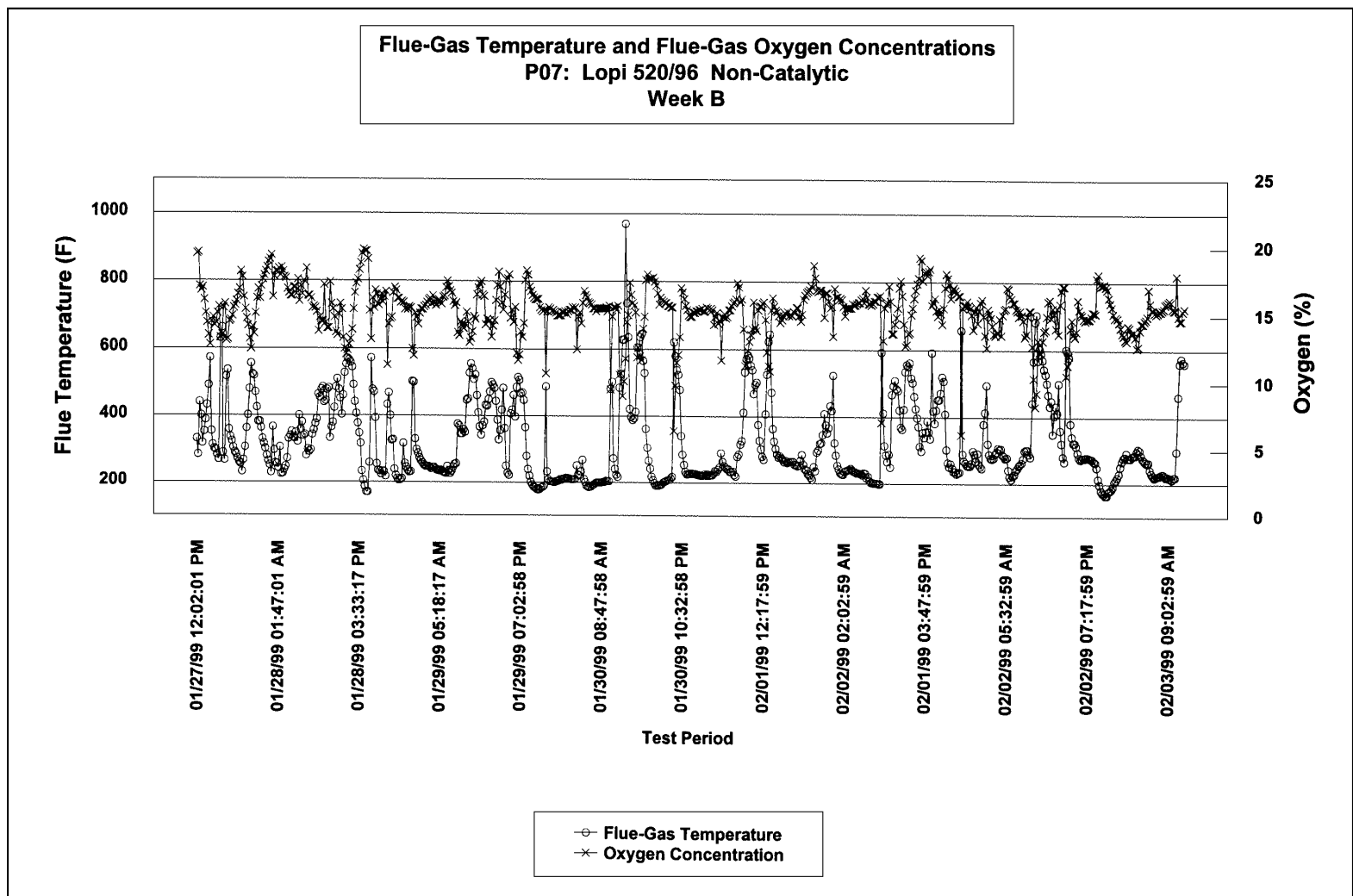
Average Flue-Gas Concentrations

Oxygen (AWES) **15.14** Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Portland, Oregon USA

Test Run Number: **Week C**

Test Period Start Date/Time: 02/03/99 12:32:01 PM

Test Period End Date/Time: 02/10/99 12:17:57 PM

Stove Model Tested: **P07: Lopi 520/96 Non-Catalytic**

Stove Type: New Tech/Non-Catalytic

Time

Total Test Period **168.00** Hours

Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F) **168** Hours

Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F) **100.0%**

ESS Settings

ESS Sampling Rate **1.109** L/Minute

Sample Cycle Duration **15.00** Minutes

Sample Time Per Sample Cycle **120** Seconds

Fuel

Total Fuel Used **406.1** KG With Moisture

Average Fuel Moisture **24.8%** Percent Dry Basis

Total Fuel Burned **325.4** KG Dry

Average Burn Rate During Stove Operation **1.9** KG/Hour (dry)

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar) **342** Degrees F **172** Degrees C

Test Facility Ambient Temperature **71** Degrees F **22** Degrees C

Particulate Emissions

Emission Factor **20.8** G/Kg

Emission Rate **40.3** G/Hour

Concentration **1416** Mg/M3

Breakdown of Particulate Sample

Rinse **23.8%**

XAD-2 **17.4%**

Filter **58.7%**

Total **100%**

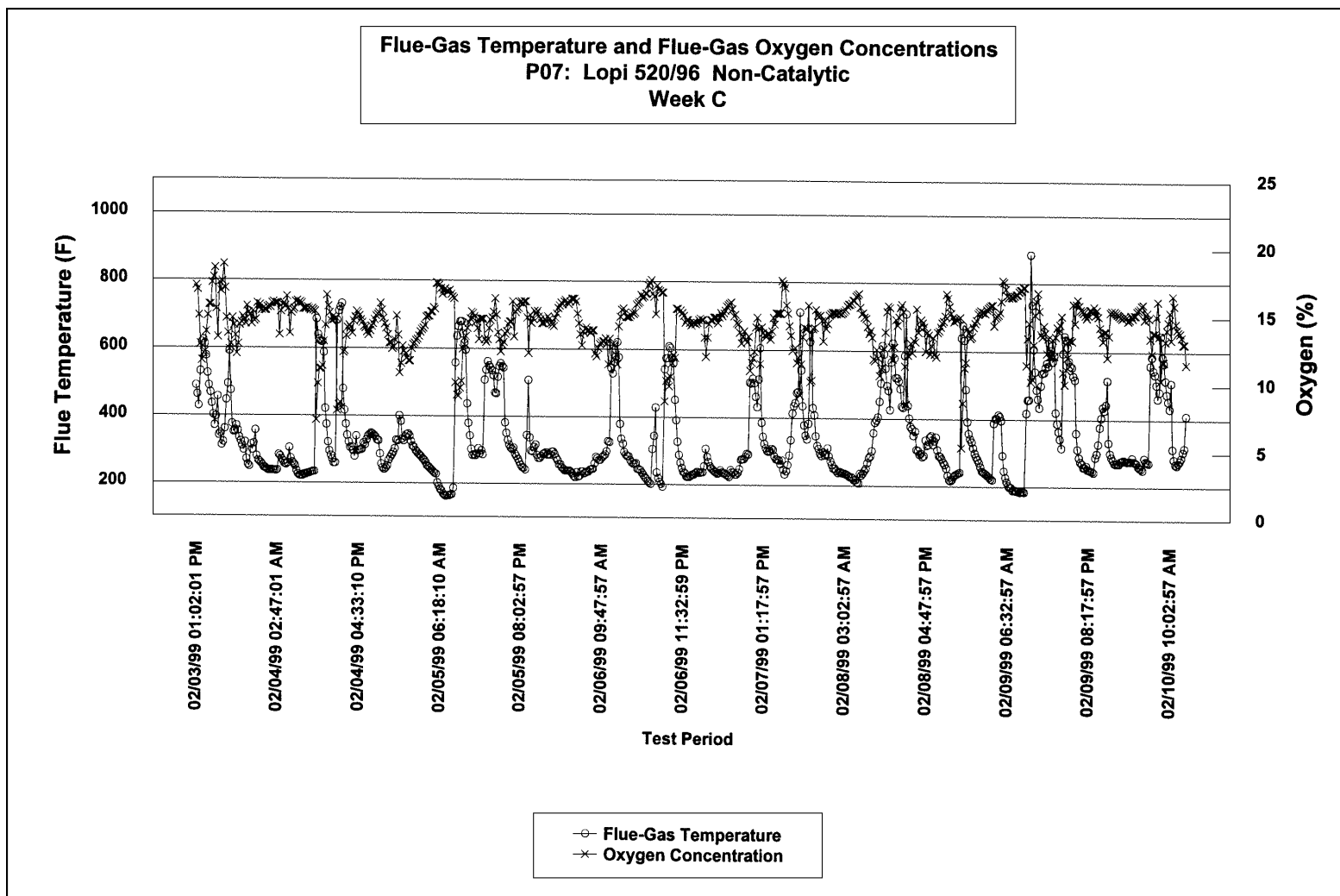
Average Flue-Gas Concentrations

Oxygen (AWES) **14.13** Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Portland, Oregon USA
Test Run Number: **Week A**
Test Period Start Date/Time: 01/22/99 10:47:02 AM
Test Period End Date/Time: 01/29/99 11:02:56 AM
Stove Model Tested: **P08: Vermont Castings Defiant Encore Catalytic**
Stove Type: Catalytic

Time

Total Test Period **133.25** Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F) **131** Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F) **98.3%**

ESS Settings

ESS Sampling Rate **1.078** L/Minute
Sample Cycle Duration **15.00** Minutes
Sample Time Per Sample Cycle **120** Seconds

Fuel

Total Fuel Used **211.8** KG With Moisture
Average Fuel Moisture **24.8%** Percent Dry Basis
Total Fuel Burned **169.8** KG Dry
Average Burn Rate During Stove Operation **1.3** KG/Hour (dry)

Average Flue-Gas Concentrations

Oxygen (AWES) **16.93** Percent

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar) **343** Degrees F **173** Degrees C
Test Facility Ambient Temperature **71** Degrees F **22** Degrees C

Particulate Emissions

Emission Factor **17.7** G/Kg
Emission Rate **23.0** G/Hour
Concentration **714** Mg/M3

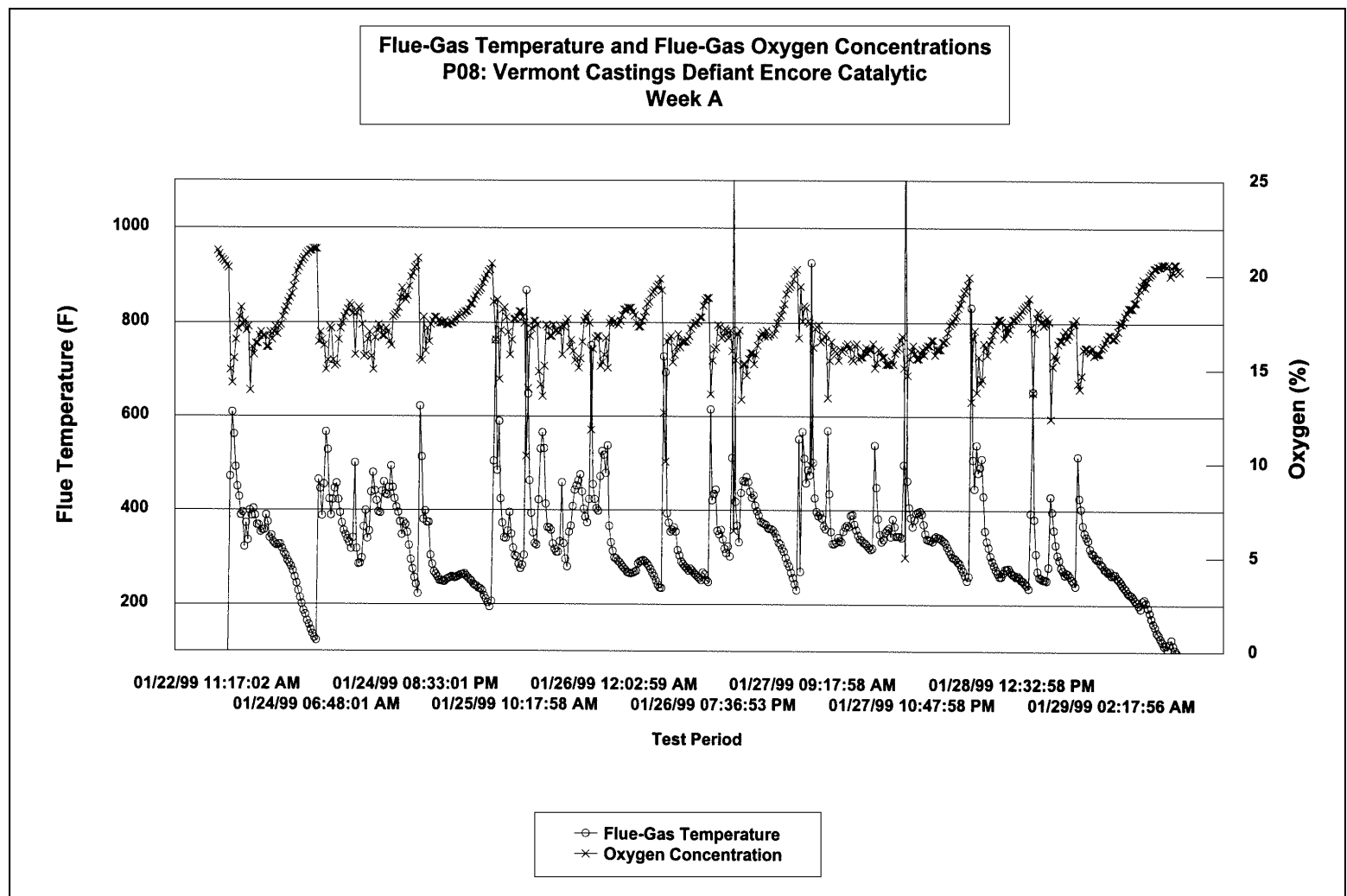
Breakdown of Particulate Sample

Rinse	46.0%
XAD-2	22.7%
Filter	31.4%
Total	100%

Test Notes:

Test Note Number 1: Stoichiometric Volume For This Test is Based on 2.0% of Fuel Carbon Generating Carbon Monoxide and 98.0% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Portland, Oregon USA
Test Run Number: **Week B**
Test Period Start Date/Time: 01/29/99 01:17:01 PM
Test Period End Date/Time: 02/05/99 02:14:37 PM
Stove Model Tested: **P08: Vermont Castings Defiant Encore Catalytic**
Stove Type: Catalytic

Time

Total Test Period **97.75** Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F) **37.5** Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F) **38.4%**

ESS Settings

ESS Sampling Rate **1.078** L/Minute
Sample Cycle Duration **15.00** Minutes
Sample Time Per Sample Cycle **120** Seconds

Fuel

Total Fuel Used **76.2** KG With Moisture
Average Fuel Moisture **25.0%** Percent Dry Basis
Total Fuel Burned **61.0** KG Dry
Average Burn Rate During Stove Operation **1.6** KG/Hour (dry)

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar) **383** Degrees F **195** Degrees C
Test Facility Ambient Temperature **74** Degrees F **23** Degrees C

Particulate Emissions

Emission Factor **15.5** G/Kg
Emission Rate **25.2** G/Hour
Concentration **657** Mg/M3

Breakdown of Particulate Sample

Rinse	49.5%
XAD-2	16.0%
Filter	34.6%
Total	100%

Average Flue-Gas Concentrations

Oxygen (AWES) **16.72** Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume For This Test is Based on 2.0% of Fuel Carbon Generating Carbon Monoxide and 98.0% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)

